

500 Notes of Thanks
to the National Science Foundation
for Supporting 15 Years
of On the Cutting Edge

On the Cutting Edge, a professional development program for geoscience faculty, brings together workshops, websites, and research activities to support high-quality undergraduate geoscience education. Established in 2002 with funding from the National Science Foundation, the program has engaged more than 3,000 faculty, post-docs, and graduate students from over 900 institutions in 109 face-to-face and virtual workshops and community-based research projects. In addition, *On the Cutting Edge* has produced a website that has more than 9,000 pages of content and is visited by more than 1,000,000 users annually.

As attested to by the comments collected here, *On the Cutting Edge* has changed geoscience education in the United States by legitimizing discussions of teaching, improving teaching practices, and establishing a culture of resource sharing that underpins continuous improvement in undergraduate geoscience instruction. This transformation was made possible by an investment of more than \$9.8 million by the National Science Foundation over a fifteen-year period.

An integral part of the fabric of geoscience education and a major source of teaching resources, *On the Cutting Edge* is now a cooperative venture of geoscience professional societies managed by the National Association of Geoscience Teachers. *On the Cutting Edge* programming has been expanded beyond its original focus on courses, pedagogy and career management to include activities that strengthen departments. These activities build on workshop programs and websites that originated as part of the NSF-funded 'Building Strong Geoscience Departments' project, which involved more than 185 departments.

The incredible reach, impact, and success of *On the Cutting Edge* would not be possible without integral support from the National Science Foundation. Collected here are comments from individuals representing different nations, disciplines, professions, and backgrounds—though all united in their appreciation to NSF for funding this influential project, the positive impacts of which will continue to reverberate for years to come.

For fifteen years of essential funding, for boldly supporting a groundbreaking project, and for investing in long-term undertakings to improve geoscience education, *On the Cutting Edge* thanks the National Science Foundation.

Sincerely,

On the Cutting Edge Principal Investigators

Rachel Beane, Bowdoin College
Heather Macdonald, College of William & Mary
Cathryn Manduca, Carleton College
David McConnell, North Carolina State University

Dave Mogk, Montana State University
Barbara Tewksbury, Hamilton College
Katryn Wiese, City College of San Francisco
Michael Wysession, Washington University

*Presented at the Geological Society of America Annual Meeting
October, 2017*

**MOHAMED
ABDELSALAM**

Thank you for making this possible. It certainly positively impacted many geoscientists including myself.

**KHALDOUN
AHMAD**

Thank you to the NSF for offering this opportunity to improve my teaching skills. I believe this was the best workshop by which to improve my teaching skills and techniques.

**MEHMET AKIF
SARAKAYA**

Thanks from Istanbul, Turkey

HENDRATTA ALI

Thank you NSF for funding this program. It was very beneficial early in my career. Great Experience. GEO-ROCKS!!!

JULIEN ALLAZ

Thank you very much to NSF for their support of the program "On the Cutting Edge"! I participated in both the "Preparing for an Academic Career" and the "Teaching Mineralogy Petrology and Geochemistry in the 21st century" groups. I was extremely pleased by the outcomes of these programs! They helped me first network with my peers, and second to better equip me with tools to pursue my academic career and to prepare the scientists of tomorrow. The richness of the US is not only reflected by its Dow Jones index, but by the quality of its research and education; I do hope this will prevail over the years to come. Without the National Science

Foundation, this would be impossible. Many thanks for all your effort, and let's keep positive!

DOUGLAS ALLEN

Thank you!!

**AMANDA
ALBRIGHT OLSEN**

Thank you!

ALISON ANDERS

On the Cutting Edge "Professor Camp" put me on the path of using evidence-based teaching methods – and I think that 10 years of students would thank you as much as I do!

**MEGAN
ANDERSON**

The Cutting Edge workshops and online materials were so essential in helping me get up and running as a new professor. The lessons I learned were invaluable and through the workshops I also created new connections with my community, which can be hard in a small department at a teaching-oriented college. Thanks so very much for your support of this program.

**GRAHAM
ANDREWS**

Signature of thanks

**REGINALD
ARCHER**

Thank you for supporting my professional development through this program and many others. I have been able to take what I have

learned from "On the Cutting Edge" workshops, sessions, and the people I have networked (and continue to) network with.

BRITT ARGOW

The Cutting Edge series of workshops has had a tremendous impact on my career and on the development of many of my students.

LEILANI ARTHURS

My thanks to NSF in haiku form: NSF supports college Earth educators' teaching and learning

PRANOTI ASHER

The resources and workshops helped me become a better faculty member and instructor when I was an academic. Now I use resources to help with AGU's heads and chairs program. Thank you NSF!

**CHARLES KIP
AULT**

I have greatly benefited from On the Cutting Edge and shared resources from this project with science educators in Chile and China. Thank you NSF.

AIDA AWAD

So many students and teachers have benefited from the On the Cutting Edge program because of the support provided. The program truly has made a long-lasting difference for many of us in Geoscience Education. Thank you!

FLORENCE B.

Thank you for your valuable support! Science rocks!

ROB BADGER

The Structural Geology workshop I attended for mid-career structural geology professors was excellent. I adopted several concepts learned there into my teaching.

ERIC BAER

This program has changed my teaching and my professional life for the better in more ways than I can enumerate. As a result, it has impacted thousands of students.

GREGORY BAKER

I hope there is a plan in the works for a follow up because your support of the Cutting Edge certainly provided an excellent hub for community advances in the geosciences!! Kudos!!

**SUZANNE
BALDWIN**

NSF's long-term support of "On the Cutting Edge" is greatly appreciated by those engaged in undergraduate geoscience education. The legacy of curricular materials developed with your support will continue to impact generations of Earth scientists. I hope that a successor program will enable this community to thrive, so that they can update/add curricular materials as needed, and so that future generations can benefit from these programs.

HUIMING BAO

I occasionally googled for teaching materials using keywords and it quite often led me to the Cutting Edge site. I am proud of having contributed to On the Cutting Edge and also glad to see it has become a popular site.

JOEL BARKER

Thank you for funding this unique and valuable program. As a post-doc, the training and insight that I received here was invaluable.

**BRADFORD
BARRETT**

Thank you for taking an interest in the career, professional, and personal development of faculty in the geosciences! My participation in the 2009 Early Career workshop was instrumental in my success as a tenure-track (and now tenured!) faculty member. I continue to use the active learning and teaching examples in my classroom and my scholarship reflects the focus I began while at the workshop.

ANDY BARTH

Thanks for supporting work that has changed the way geology is taught in many colleges and universities, including mine! This project made a difference in the educational experiences of many IUPUI students.

JULIE BARTLEY

The On the Cutting Edge program has been transformative for the Geosciences. No other

scientific discipline seems to have the level of communication, respect, and understanding of the role of pedagogy in the work we do. Faculty and informal educators of all experience levels have been shaped by this program, and the landscape of our classrooms is forever changed.

**CHANDRANATH
BASAK**

Thank you NSF for supporting this program. I attended the "On the Cutting Edge" early career workshop and the overall experience, learning, and the contacts that I made through this workshop are some of the things that helped my academic growth immensely.

RACHEL BEANE

The CE project has catalyzed the geoscience community in amazing and significant ways. I have benefitted from its programming and resources that have helped me to grow as an educator, a leader, and a community member. Thank you!

**CAROLINE
BEGHEIN**

Signature of thanks

MIKE BENEDETTI

Cheers and congratulations on many years of success with this valuable program!

**CHRISTOPHER
BERG**

The On the Cutting Edge program has been an invaluable part of my career development, from

graduate student, to early-career faculty, to tenured faculty. The activity collections, workshops, and sponsored meetings have all helped my development and growth as a teacher mentor, and researcher. I am thankful for the opportunities that On the Cutting Edge has provided for me, and for the support of NSF throughout the years.

W BERRY LYONS

Thanks!

**ANTONY
BERTHELOTE**

Great resource for the educational community that keeps growing and giving.

MARK BESONEN

Dear NSF, EAR, and DUE staff, I write this short note to offer you thanks for your continuing support of the fantastic "On the Cutting Edge" program organized through Carleton College. I am an alum of one of the program's Early Career Geoscience Faculty workshops, and I tremendously appreciated the advice, guidance, and support of both veteran faculty and other peers that was made possible by the NSF's financial backing. I highly encourage you to continue supporting this effort that supports excellence in both geoscience education and faculty development.

**ROBERT
BLODGETT**

Thank you so much for funding and supporting the On the Cutting Edge project. Without

question it has had a greater impact on geoscience instruction in the United States than any project since the Earth Science Curriculum Project over 50 years ago. I participated as a facilitator in an On the Cutting Edge Workshop in 2005 and mentored four community college faculty at the workshop. Three of those faculty have gone on to become leaders in 2-year college geoscience education, and two have led multiple workshops mentoring a new generation of 2-year college geoscience teachers. The leadership and expertise of the P.I.'s on this project has been outstanding, and the ongoing support by the National Association of Geoscience Teachers has been invaluable. The impact of this project on teaching and learning will continue for generations. Thank you again for funding and supporting this transformative research in geoscience education.

**ANDY
BOBYARCHICK**

Signature of thanks

**FLORENCE
BOCQUET**

Thank you for the continuous support of On the Cutting Edge!

REBECCA BOGER

This is a wonderful program and resource that I use frequently. When I am thinking of ideas for a course, the first place I go to is the SERC website. Fantastic!

**KATHERINE
BOGGS**

I wanted to thank NSF for the exposure to the Cutting Edge community in the US. As a Canadian, I have benefited enormously from being a guest at Cutting edge workshops for teaching field schools and petrology. I feel very grateful for having this exposure to the wealth of expertise across the US as the Canadian community is at least two decades behind the US geoscience education community. Building the Cutting Edge materials on the SERC website has been incredibly beneficial to the international geoscience education community.

JAMES BOOTH

The workshop helped me develop teaching plans, gain perspective on the spectrum of earth science teaching and research, and confirmed for me that I had chosen the right field of work. Thank you for funding this useful workshop.

SIMONA BORDONI

Thank you for supporting this outstanding program!

STEPHEN BOSS

Over the years, I have contributed educational materials to InTeGrate and I have benefitted from InTeGrate workshops. Thank you for your support of quality geoscience education!

ALAN BOYLE

I attended the Teaching Petrology in 21st Century workshop in Montana and the Affective Domain workshop at Carleton. Both were

fantastic and gave me lots of ideas that I have used in my own teaching but have also disseminated around the UK. I also met a lot of engaged North Americans who I have remained in contact with since. This program has been great.

JOHN BRADY

Cutting Edge programs have had a profound effect on teaching in the Earth sciences. Please continue to fund education programs. They make a difference that affects the careers and productivity of scientists and future scientists. Thank you, NSF staff and administrators. Thank you, Congress, for funding NSF and all it does.

MARA BRADY

This workshop helped kick start my tenure track career. I refer back to lessons I've learned all the time!

BRETT BRANCO

On the Cutting Edge has been magnificent and your continued support has been instrumental in this success!

MARK BRANDRISS

Thanks for providing opportunities to discuss teaching philosophies and methods with my colleagues all around the country!

**JULIE BRIGHAM-
GRETTE**

On the Cutting Edge is an outstanding program that the geoscience community everywhere has come to deeply appreciate and rely on!

LAURIE BROWN

Thank you for your support of the On The Cutting Edge program for Geoscience Faculty over the past 15 years. Attending the workshop on Teaching Geophysics was a wonderful experience which allowed me to improve my Intro Geophysics course, extend my network to others teaching a similar course, and generally effected all my teaching activities. Money well spent!

**SHARON
BROWNING**

On the Cutting Edge has been instrumental to me in my geoscience education position. It has helped me take a step back from content-focused learning and strategize student skills, and improved my assessments.

SARAH BROWNLEE

I've participated in two On the Cutting Edge programs, and both were immensely helpful to my teaching and my professional development. Not to mention both were wonderful opportunities to develop a network of colleagues from other institutions. I am extremely grateful for these opportunities, and I know I would not be where I am in my career without them. Thank you!

SEAN BRYAN

Thank you for supporting On the Cutting Edge. I found On the Cutting Edge to be an amazing resource that helped me immensely when I was starting out as a new Geology Instructor, and I continue to use the resources to this day.

DAVID BUDD

On the Cutting Edge was my gateway to active learning, constructivist approaches to learning/teaching, and DBER. It led to career changes and a greater focus on teaching and learning. My students and my institution benefited, and continue to benefit greatly. Thank you, NSF

KATE BULINSKI

The Cutting Edge workshops I attended were incredibly valuable for improving my course designs! Your support for this program is much appreciated. Thank you!

**KURTIS
BURMEISTER**

Thank you for your support of On The Cutting Edge - this program has had a HUGE impact on my development as a professor (multiple curriculum development workshops, online resources), research professional (early career development workshop), and an academic citizen (leadership and communication workshops). I have and will continue to utilize these fantastic Cutting Edge resources and recommend them to my colleagues and students.

PAMELA BURNLEY

Thank you for your support of On the Cutting Edge. I authored a group of modules describing the science and techniques used in mineral physics which I wanted to make widely available on a stable internet platform. On the Cutting Edge has provided that platform. I could have posted everything on my own website but as my campus has changed internal domain names etc. links to these pages would have rapidly become stale. Through On the Cutting Edge my materials have been widely disseminated and I know that they will continue to be available without continual maintenance on my part. Thus, my efforts in creating the materials have been leveraged to create a permanent resource, which I could not have done on my own. In addition, as a teacher, I find On the Cutting Edge useful for locating resources shared by others. So Thank you NSF for your support of this great community resource.

ROBERT BUTLER

On the Cutting Edge workshops and support for young geoscience faculty are models of STEM education. As with almost all major research and education activity in the US, NSF support has been an essential ingredient fueling this program Thank You.

**ELEANOR
CAMANN**

Thank you for making these experiences possible for those of us at institutions that do not have the funding to pay for our participation.

DAWN CARDACE

On The Cutting Edge enhanced my pre-tenure experience significantly, and continues to strengthen my professional performance. Many thanks!

MICHAEL CARDIFF

The Cutting Edge workshop provided me with so much great advice that helped me prepare for my academic career. I'm sure that their mentorship had a part in my success getting my first few grants! What a great program!!

GREG CARLING

The Early Career Workshop was the most valuable training I received for my new position as assistant professor. Thank you!

**SARAH
CARMICHAEL**

Dear NSF, Thank you so much for your support of On The Cutting Edge. The SERC website has been massively helpful in building my classes, and the Early Career Workshop was absolutely life-changing. Following the guidelines and great advice that I got from the Early Career Workshop has resulted in grant funding, a successful publication record, wonderful teaching evaluations, and tenure. Your support of this program has helped so many people be successful researchers and instructors.

**CHARLES
CARRIGAN**

As a geoscience educator in a small college program, I'm required to teach many courses outside my primary area of expertise. The On the

Cutting Edge program has been absolutely invaluable to me over the past 15 years, so I want to take this opportunity to say "Thanks!!!" to NSF for helping make this endeavor possible. Virtual high-fives and fist-bumps to all!

**ISLA S.
CASTENEDA**

On the Cutting Edge workshops have helped me immensely in my career. Attending the Preparing Future Faculty for a Career in the Geosciences Workshop gave me numerous ideas about how to improve my teaching, how to improve communication, and insights into all the little things I needed to do to get a postdoc and eventually a faculty position. As an assistant professor, I attended the workshop for early career faculty after my first year and the information I received there was critical for navigating an extremely challenging position at an R1 university. I'm a first-generation college graduate and so these workshops were especially important to me because certain aspects of academic positions were not at all familiar or obvious to me. I cannot say enough great things about the On the Cutting Edge workshops and I always encourage students, postdocs, and new faculty to attend. Thank you!

CINZIA CERVATO

Thank you for supporting one of the most impactful professional development programs in the geosciences.

CLARA CHAN

I cannot thank you enough for supporting this program - I am an alum of three workshops which were instrumental in shaping my approach to teaching and my career. In addition, the online resources for mineralogy and geochemistry were invaluable in preparing my class. The program came at just the right time to give me support prior to my job search, and through my assistant professor years. I feel I am now a member of a vibrant and supportive pedagogical community, which I hope will last well into the future.

ALEX CHAUCER

The workshops I've attended and resources I've used are of huge value to the Geoscience, Geology, and Environmental Studies fields. I share them with all new faculty and they find resources that they can immediately put to use. On the Cutting Edge is a wonderful project making a large impact on science education and tomorrow's future leaders. Thank you, NSF

DOUGLAS CLARK

On the Cutting Edge short courses and materials have benefited our entire geology faculty at Western Washington University. I want to thank the NSF for the foresight in funding this valuable program, for both helping our department significantly improve our degree programs through the years, but in particular for helping us produce even better geologists to help drive our nation's economy and scientific programs.

BILL CLEMENT

This is a fantastic collection of helpful, imaginative ideas for improving teaching and learning! The Cutting Edge is an invaluable resource.

PHOEBE COHEN

Thanks for supporting this amazing program. The Cutting Edge workshop helped me start my faculty job off on the right foot and maximize my time and energy. I learned so much and loved the format and supportive environment. Please keep supporting this important project!

JENNIFER COLE

Thank you for your continued support of On the Cutting Edge. This program has been invaluable to me, from the first workshop that I attended as an early graduate student, to the resources that I continue to learn from and utilize in my classroom teaching today. On the Cutting Edge is my go-to source for innovative and insightful strategies for conveying everything from fundamental concepts to new data and discoveries in the geosciences to my students. I also greatly appreciate the community of peers that Heather Macdonald has so thoughtfully cultivated over the past 15 years. These colleagues generously share their time and ideas, greatly benefiting students, other teachers and researchers, and the public at large. I hope this is the first of many anniversary celebrations for this outstanding partnership.

LISA COLLINS

Thank you for your continued and generous

support of On the Cutting Edge. I have benefited from their workshops at several stages in my career and I can credit them directly for my career path into community college education. They are an incredible resource for our geoscience community!

**CHRISTOPHER D.
CONDIT**

Thanks for making possible a hugely important program that connects teaching, state-of-the-art researchers and students, enriching and invigorating geology for a decade and a half.

MEA COOK

I am constantly grateful to be in a discipline that has the Cutting Edge as a resource, from the Preparing for an Academic Career workshop, to the Early Career Workshop, which were invaluable for sound advice and great networking with peers that became a support group, to the in person and virtual teaching workshops, and online database of teaching materials.

KATIE COOPER

Cutting Edge has helped me when I felt panicked about a lecture topic or wanted to find a more hands on activity. Thank you!!

PETER COPELAND

Signature of thanks

SEAN CORNELL

Since 1950 NSF has been supporting fundamental, cutting edge science research and more recently has helped support the development of programs to help inspire, develop, and engage new scientists! This work has been important, critical, and most importantly inspiring to all of us who have grown up to be scientists ourselves. That alone deserves much thanks. However, for me personally, my gratitude goes further. Your support of Cutting Edge, InTeGrate, and many other programs to inspire, engage, and help faculty across the country has helped us to become better educators. I am a better, more inspired educator because of the work that NSF made possible. You have helped us to not only engage in critical science, you have encouraged us to share our scientific expertise, and you have helped us to become more effective communicators of the very important work that we do for our students! For this, I thank you. The positive momentum that NSF has helped to make possible cannot, however, be left alone and unsupported moving forward. There is still much science to be done. There is still much work to do to recruit new and diverse perspectives from all walks of life. We can't do that work effectively or as freely without the continued support of the National Science Foundation. Once again... Thank you, thank you, thank you!

CLAIRE COYNE

Signature of thanks

ALEX CRAWFORD

I was introduced to On the Cutting Edge as a grad student in a Pedagogy class. I've used it for teaching resources and inspiration several times and highly recommend it to colleagues!

**MARGARET
CRODER**

Signature of thanks

VINCENT CRONIN

I have participated in various aspects of the "On the Cutting Edge" project for most of the last 15 years as a participant, presenter, workshop leader, author, and user of resources developed through OCE and maintained at SERC. (SERC is a national treasure.) For example: - My work on the lab books I have written or edited for introductory physical geology courses (including the current edition of the AGI/NAGT Laboratory Manual in Geology) has been significantly informed and enhanced by my academic growth spurred by OCE. - My methodology for using earthquake focal mechanism solutions to find the surface trace of seismogenic faults (SLAM) was developed as a result of a presentation I was asked to make at the first "teaching structural geology in the 21st century" workshop. - My understanding of virtually everything I now think I know about how to teach effectively is tied to the OCE workshops I have participated in and to the enduring communities I am now a part of as a result of OCE. - My inclination to mentor students and other faculty members with respect to effective teaching is directly related to OCE. - Encouragement for my development of pedagogically useful physical models is related to OCE and has been enhanced through

presentations at many professional meetings over the years. OCE and the SERC-based projects overall have had a transformative effect on geoscience education by creating communities that develop and propagate best-practice methods for effective geoscience education. I am personally very grateful to the OCE leadership team, and to the National Science Foundation for supporting them over the years. Funding OCE has been an investment that has paid dividends that are worth much more than the funds awarded. The "On the Cutting Edge" project has had a decidedly positive impact on student learning and on geoscience education in general.

**BENJAMIN
CROSBY**

So many thanks for supporting the creating and dissemination of these resources. It improved my career dramatically. Thanks!

BROOKE CROWLEY

I firmly believe that my experience with Cutting Edge has been critical to my success in Academia I would do it again if I could!

**MICHAEL
CUMMINGS**

Support by NSF has greatly moved teaching and learning forward in the Earth sciences. Thank you!

H. ALLEN CURRAN

The "On the Cutting Edge" program in the geosciences represents NSF money very well spent!!! A BIG Thank You to NSF.

ANDY CZAJA

Thank you for the opportunity to develop my teaching skills and make some great friends in the process!

MEGAN D'ERRICO

Thanks for providing the space to collaborate and compile resources for teaching and learning!

NICOLE DAVI

Thank you NSF for supporting this program. I attended Cutting Edge workshops that were tremendously helpful for preparing me to interview for tenure-track positions, for thinking about how to succeed as an academic, and for networking with my peers. On the Cutting Edge has been, and continues to be, an amazing support for early career scientists.

CAM DAVIDSON

The many workshops, development of teaching materials, and friends found thanks to On the Cutting Edge have been instrumental in the success of my career. Thank You NSF!

PHILLIP DAVIS

I appreciate the support.

AMELIE DAVIS

The resources found on the "Cutting Edge" site are invaluable. I routinely use them to prepare classes and labs. It is a rich resource that has been vetted and thus can be trusted to deliver a quality

product. I once attended a workshop which was also highly valuable. Thank you NSF for funding this program. I hope it receives continued support.

THOM DAVIS

The On the Cutting Edge project is the best thing since sliced bread; thanks, NSF!

LESLIE DAVIS

The Cutting Edge programs have developed and strengthened collegiality among professors at diverse and physically distant colleges and universities. My relationships and friendships with colleagues were invaluable in developing unique and successful teaching techniques. Without the meetings, I do not think that my teaching of students could have been as effective. I encourage the continuation of this unique peer-led learning program. The entire experience has been terrific.

PETER DAVIS

Hello NSF. This is the way to support science and science outreach. We educators in the trenches need this exact resource to bring science to the people. Feel free to not fund any other project in favor of helping develop faculty early, and with the outreach mission so important nowadays. Thank you.

ANDREW DE WET

Thanks to NSF for supporting this important resource for geoscience professionals!

**MICHAEL
DEANGELIS**

On behalf of myself and my students, thank you so so much for supporting the On the Cutting Edge project! Because of your support, I have been able to participate in both the Preparing for an Academic Career and the Early Career workshops, partake in countless professional development webinars, and use materials from the project in several of my courses. As I enter into tenure review process at my public university, I know that the professional development opportunities made available by the On the Cutting Edge project have helped me to become a strong candidate for advancement in my career.

SUSAN DEBARI

Thank you for funding this fabulous project that has changed the landscape of geoscience education!

PETRA DEKENS

Signature of thanks

KRISTINE DELONG

Signature of thanks

ANKUR DESAI

As a student participant, a presenter, and a co-leader, the Preparing for an Academic Career in the Geosciences and the materials supported by On the Cutting Edge have been essential in building a capable and diverse academic workforce in geosciences. I think we can directly

trace some of the gains in workforce diversity and growth in relevance of geoscience research and education to society directly to the work done here.

RATAN DHAR

I would like to thank NSF to sponsor the junior faculty professional development workshops on geoscience education. The workshop taught me a lot from effective techniques to engage the students and undergraduate research agenda, to time management and how to balance the personal and professional life. Honestly speaking, those workshops helped me have a solid short term and long term professional goal which ultimately made my transition to Associate with tenure seamless. Once again, I would like to thank the NSF and the PIs who reflect their sincere thoughts to come up with the training workshops that help faculty growth in Geoscience fields.

**AARON
DIEFENDORF**

Thank you so much for your support! My students and I would not have happy successful careers without On the Cutting Edge. Please continue to support this critical program!

**DAVID
DOCKSTADER**

The opportunity to share with other faculty has been helpful.

GLENN DOLPHIN

Thanks very much for the foresight in funding such a valuable project.

**ABIGAIL
DOMAGALL**

Thank you NSF for your continued support of On the Cutting Edge! I attended the Early Career Workshop years ago as a new Professor and found amazing advice and great new friends and colleagues. I'm a frequent user of the Cutting Edge website and I direct many colleagues that way also. Thank you again, so much, for your support of this invaluable resource.

LISA DONER

Over the last 15 years I have extensively benefitted from, and contributed to, the outcomes of Cutting Edge activities, from participating in workshops (one or two a year) to use of online materials (several times each semester). My pedagogy skillset has improved more through mentoring and engagement with Cutting Edge than by any other training over my 25 years of professional development. Thank you for supporting them!

BRETT DOOLEY

Thank you for supporting On the Cutting Edge; my students and I have benefitted from multiple online workshops provided through the grant.

**GREGORY
DUMOND**

Thank you so much, NSF, for all of your support of this excellent program. It has supported all kinds of innovation in teaching, education, and

outreach. I myself benefited from the early career workshops, and I have used many of the online materials available at their website.

TASHA DUNN

Thanks so much for funding this amazing resource.

STEVE DUNN

I have used this site more times than I can count. The workshop I attended was first rate and led to lasting improvements in my classroom teaching. A career changer! Thank you for funding this program!

WILLIAM DUPRE

I have been teaching at the University of Houston for 40+ years, and I have found information from "On the Cutting Edge" exceptionally helpful in keeping me up to speed in an era of rapid change. Thanks for all your support!!

ALISON DUVALL

Thank you NSF for supporting the On the Cutting Edge early career workshop in geoscience. It was an absolute game changer for me. I also recommend that all junior faculty attend one, it's that important!

ALICE DUVIVIER

Thank you for sponsoring me to attend this workshop relatively early in my graduate student career. It helped me plan ahead while in

school to help me achieve career path goals and prepare for alternate paths as well.

TIM EATON

Many thanks for helping establish a vital teaching resource for STEM.

JAMES EBERT

I have been a part of On the Cutting Edge workshops as a participant and as a team leader. I can honestly say that no other experience has had a greater impact on my teaching than these workshops. They have literally transformed the way that I teach students about the Earth!

BEN EDWARDS

Hugely effective investment of tax dollars for secondary and higher education.

ANNE EGGER

My own teaching and the teaching in my department would be totally different without the support of Cutting Edge. Several of us "grew up" professionally through the Career Prep and Early Career workshops, and even more of us have redesigned and reinvigorated classes after attending the Teaching X workshops. As a result, our curriculum is more student-centered, project-based, and coherent than it would be otherwise, and our faculty are successfully balancing research, teaching, and service to achieve tenure.

**LINDY ELKINS-
TANTON**

On the Cutting Edge has helped and inspired me in many ways -- I have participated in their workshops, collaborated with them to add curriculum material to their big fantastic library, have sent junior faculty from our units to learn from them, and have benefitted from the online material. I'm so grateful for the vision of this project!

**KRISTEN ELLEN
KUDLESS ST. JOHN**

The On the Cutting Edge Program was formative to my career success. As a participant or co-leader in a number of OCE workshops, OCE helped me approach my career in a thoughtful and constructive way. It made me a better teacher, colleague, and now mentor to others. Thank you NSF for funding this important program for so many years. It was a very valuable investment in the geosciences!

**NORLENE
EMERSON**

Thank you NSF for the support of the "On the Cutting Edge" program. I have used many many teaching materials from this site (as well as contributed materials) to enrich and improve my teaching and the learning experiences of my students. On the Cutting Edge workshops and resources have been invaluable to my teaching.

**CHERYL EMERSON
RESNICK**

I have participated in On The Cutting Edge workshops since early in my teaching career. The opportunity to learn new activities, share ideas, and make connections with other geoscience faculty has positively changed the

way I teach. My classes are much more engaging, I have a network of faculty/friends I can reach out to with questions/ problems/ concerns who have experiences to share, and a rich catalog of teaching resources available through the SERC website. The enriching experiences and connections with other faculty stimulate my interest to try new approaches in my classes and raise my awareness of issues faced by my students that I may not have experienced. Thank you, NSF, for your continued support of On The Cutting Edge.

VASILE ERSEK

Signature of thanks

MICHAEL EVANS

Dear NSF, thanks for supporting this program. I still build on teaching methods I learned in three workshops, and I have passed along received mentoring wisdom to generations of graduate students.

CAROLYN EYLES

Thank you for all your support - you have made so many exciting initiatives possible.

RENEE FAATZ

On the Cutting Edge workshops and online materials have made more of a difference in my teaching than anything I have ever encountered. My students have benefited in increased opportunities for undergraduate research, internships arranged through connections I have

made at workshops, and innovative teaching.

CYNTHIA FADEM

My students and I thank you! These funds have had an immeasurable effect on my professional development, on my students' learning, and the forwarding of the importance of science in society. Inspiring and launching the careers in science that will help humanity thrive in the coming years is costly work and we literally couldn't do it without you!

LEIGH FALL

I greatly appreciate the opportunity to attend the Early Career Workshop. It helped to see that I wasn't the only young faculty member feeling like I did. Plus, our discussions of pedagogy were helpful for someone who had limited teaching experience.

YUANYUAN FANG

I just want to express my deepest gratefulness to NSF for your consistent and long-term funding of this great program! I participated in this program right after my PhD graduation and it was a very valuable experience. Thanks a lot!

MARTIN FARLEY

Cutting Edge has been a valuable contributor to my teaching and my students' learning.

CHRISTA FARMER

I very much appreciate the inspiration that "On the Cutting Edge" has provided for my teaching, research, and service. The techniques, approaches, and perspectives that I have learned from several "On the Cutting Edge" conferences prove valuable to me every day. Thank you NSF for supporting this fabulous program!

AIDA FAROUGH

Signature of thanks

JAMES FARQUHAR

Thank you, I was a participant in the course as a fresh Asst Prof. and found it invaluable for my own career at many levels (academic, managing time, research, establishing a peer network) and credit it with key skills necessary for my eventual promotion. I also participated as a moderator for several years and learned even more valuable information about myself, but importantly also met, worked with, and shared this information with participants in those years. We have had the course at UMD in a few of the recent years and I have had an opportunity to meet participants who either wander into the department to talk, reach out to me, or who I have reached out to. All in all, I cannot think of a more important contributor (some things clearly must be as important) to the success of Earth Science faculty at all levels and to making a system where not just the status quo is maintained, but where new people, new ideas, and change for the better occur. Thanks again.

KRISTINA FAUL

Thanks NSF for supporting this wonderful program! My students and I have benefited greatly from all we have learned from On the Cutting Edge!

SARAH FEAKINS

Thanks for supporting this great resource to ensure high quality teaching resources are efficiently available.

JOSHUA FEINBERG

Thank you for supporting On the Cutting Edge, which has provided a common source of instruction for Geoscience faculty around the world.

MICHAEL FENSTER

Thank you very much for the support. I have solid evidence that the paradigm shift I've had in my teaching as a result of this support has benefitted hundreds of 18-22 year olds and the world we live in.

ROBERT FILSON

NSF funding of "On the Cutting Edge" has been a tremendous investment in improving geoscience education. Thanks also to Heather, Barbara, David, and Cathy for their personal involvement in this project!

TIMOTHY FISHER

Thanks NSF for the funding! The faculty and students in my department have benefited

greatly from the variety of resources made available to them.

ALEJANDRO FLORES

Thank you for funding this critically important workshop for early career faculty development. It was instrumental in introducing me to evidence-based teaching practices and also providing key insights into the process of NSF panel reviews. I believe much of my success as a grant writer (i.e., CAREER awardee, CZO Co-PI) originates from my attendance at the Early Career workshop.

RICHARD L. FORD

Thank you for supporting and facilitating the professional development of our nation's geoscience educators. The positive impacts of this program will extend well into the future.

JOHN FOUNTAIN

Cutting Edge has been an amazing source for ideas and content in course development. What a great idea. So glad NSF has provided long term support.

LYDIA FOX

On the Cutting Edge workshops have provided faculty with incredible professional development, fostering in depth conversations about curriculum among faculty from a wide-range of institution types. The curricular revisions that came out of these workshops have helped improve geoscience education for countless students. Thank you, NSF!

ANDREW FRAASS

I appreciate the existence of the On the Cutting Edge program. I participated in a weekend workshop, which I fully believe aided in my search for a faculty position. Additionally, as a faculty member now developing courses for the first time, the example course materials on the website have been invaluable. Thank you for supporting this very necessary program.

KRISTIE FRANZ

New PhDs are thrown into a position with responsibilities they haven't been trained for and only understand through observation of mentors and advisers (if lucky enough to have a good one). This workshop helps new faculty lay the groundwork for how to approach their job in new and innovative ways. I learned philosophies and techniques for teaching I had never heard of before and I learned about cultures and environments that other new professors were experiencing. This is a great resource and should remain a top priority for NSF and anyone who has attended or is planning to attend a university in the United States.

KURT FRIEHAUF

Thank you for supporting the Cutting Edge program. I was a participant at an Early Career workshop near the beginning of my career. I learned not only good tactics and strategies for my job, but also met many other young faculty who were similarly frustrated by harassing senior faculty, etc. This taught me that changing institutions was not a guarantee to a better work environment, so I focused instead on excelling in

my work here and slowly changing culture here. With time and a lot of effort, I was able to hire similarly progressive faculty and together we succeeded in raising the bar at Kutztown University (special thank you to Dr. Ed Simpson and Dr. Sarah Tindall in this effort!) Without the Cutting Edge program, I would likely have left Kutztown, possibly to a better job or maybe more of the same, and the working-class students who have been helped by our improved program into careers that value their minds more than the muscle in their backs would be digging ditches instead. I just yesterday and this morning recommended the Cutting Edge program to two early-career faculty. This program is a brilliant investment! Thank you for supporting it.

GARETH FUNNING

This program taught me how to do my job! It was enormously helpful for my career. Thanks for supporting it!

JOSH GALSTER

Thanks NSF for your support of this program over the years. I know it transformed my career when I was a participant, and I've now been fortunate enough to help facilitate the summer program and see its impact on the new faculty just starting. This program has and will have lasting effects on many, many geoscience faculty at all types of institutions.

TRENT GARRISON

I've always had a great time. Thanks for all you do!

TEJ GAUTAM

Thank you NSF. Early career workshop was one of the must have session for professional in academia. I hope it continues for future generations.

JENN GEBELEIN

Thanks so much for your continued support of this effort. I and my colleagues have used these materials so many times and the approaches and pedagogy are wonderful and thoughtfully accomplished.

JOHN GEISSMAN

Many, many thanks for supporting this tremendously valuable program with such a great positive impact on geoscience education!

**EMILY GERAGHTY
WARD**

Thank you so much for the time the program officers have taken to speak with us about grant funding and for providing feedback on our ideas for proposals. We appreciate you!

LESLIE GERTSCH

Such long-term, multi-faceted efforts as On the Cutting Edge should be maintained for all areas of science and engineering education!

DEIDRE GIBSON

I attended On the Cutting Edge 13 years ago, and it provided me with the tools I needed to become

a more effective instructor. I developed skills at that workshop that I still use today. Because the student-centered techniques I use in the classroom are so effective, many of my colleagues have switched to that type of instructing. It has innovated the course instruction in the Department of Marine and Environmental Science at Hampton University.

**KATHLEEN
GILBERT**

I appreciate having the opportunity to attend a Cutting Edge workshop to share with my peers the joys and difficulties of teaching Geosciences to mostly non-majors. I was able to incorporate new ideas and learning into my teaching, gain perspective about my home institution, and contribute to the content available on the Cutting Edge website – all productive experiences. I also appreciate having Cutting Edge as a resource when I'm looking to change something in my course, or adding something totally new. Thanks for the support over all these years!

**WILLIAM
GILHOOLY**

Cutting Edge is a fantastic opportunity. I had the pleasure of attending one workshop as a graduate student and another as a new faculty member. Both helped me immensely with my career development. Besides the expert advice I received from accomplished scientists within my field of Geosciences, I also met many new colleagues that I'm friends and collaborators with today. I greatly appreciate the support that NSF has provided to sustain this amazing mentorship program.

BRETT GILLEY

The Cutting Edge is an excellent program that has helped disseminate so much knowledge to the Geoscience community. Thank you for helping strengthen our community!

DAVID GILLIKIN

Signature of thanks

MATT GILMORE

Thank you for supporting this wonderful program for new faculty!

SCOTT GIORGIS

Signature of thanks

JENNIFER GLASS

Thank you, NSF, for this fantastic program, which played a key role in my career development. I'm forever grateful for your support.

ALLEN GLAZNER

Thanks! This made a big impact on my teaching.

SARAH GODSEY

Thank you for funding this program. This was likely the best career workshop I attended, and I continue to recommend it to new faculty colleagues and friends. I particularly appreciate the combination of practical advice, time to consider how to implement it in my own

circumstances, and networking that it facilitated. The effect of this program improved my relationships with my colleagues in my department and across campus, my mentorship of students, my research plans, and the quality of my teaching: an impressive cascading effect that ripples out even years later. Thank you for making such an impact possible.

**STEVEN
GOLDSMITH**

Thank you for investing in this program which has ushered forth a new era of instructional learning in the geosciences. The collective resources and community discussion resulting from this initiative have greatly benefited the critical thinking and problem-solving skill sets of the next generation.

**ENRIQUE GOMEZ
DEL CAMPO**

It is the support of NSF for programs like these (On the Cutting Edge) that help minority natural scientists like me succeed. Thanks!

**ANDREW M.
GOODLIFFE**

Thank you to NSF for funding the Cutting Edge program. The workshops have been some of the most impactful in my career that I have attended. By extension, they have had a tremendous impact on the development of my students as scientists. As I talk to my colleagues in other disciplines, I realize how far ahead of the curve, in terms of pedagogical approaches, these workshops have allowed geoscientists to be.

**ELIZABETH
GORDON**

Signature of thanks

PAMELA GORE

Many thanks for all you have done to advance the science and teaching of Geology.

**LISA GRANT
LUDWIG**

Signature of thanks

KYLE GRAY

The On The Cutting Edge program has benefited me in several ways. First, the Early-Career Faculty workshop was instrumental in helping me outline my pre-tenure agenda and allowed me to network with several faculty in my field and region. Second, I have benefited from the online resources that are available. I have used many of them in my geology courses and the collection is one of the first places I go when I am looking for new ideas. Third, I have received recognition for quality items that I have submitted to the On The Cutting Edge collection. This form of evaluation and validation contributed to my overall tenure package as a geoscience education specialist. Lastly, the On The Cutting Edge workshops have given me opportunities to grow as an educator and mentor. Thank you for your on-going support for this program.

**CHERYL
GREENGROVE**

Thanks NSF for supporting Geoscience Education.

LISA GREER

Signature of thanks

ERIC GROSFILS

Involvement in On the Cutting Edge has made a significant difference to my career, connecting me with leaders in the field of geoscience education who constantly help me see ways in which my teaching can improve. As a leader of workshops, a participant in workshops, a regular contributor to and user of the related SERC teaching archives, and someone who has encouraged many other junior and senior faculty to become involved, it is clear to me that On the Cutting Edge has been a bright light for our geoscience teaching community. Thank you, NSF, for your long-term support of this incredible resource. There is no question in my mind that it has had an impact well beyond what the funds dedicated to it might suggest!

DEBORAH GROSS

Thank you for supporting this great work!

TIM GROVER

Thanks so much for your support of the "On the Cutting Edge" professional development resources. I utilize resources from Cutting Edge website routinely in my teaching. I have also attended two cutting edge workshops that have influenced how and what I teach. Thanks again.

**ERIKA
GRUNDSTROM**

Thank you for helping fund "On the Cutting Edge" for the past 15 years! While I am technically an astronomer, I teach planetary science and I've been able to attend workshops and utilize the website so it's been great!

CHUANHUI GU

Thank you, National Science Foundation, for such a life-changing experience!

LAURA GUERTIN

Signature of thanks

**STEVEN J.
HAGEMAN**

Signature of thanks

CYNTHIA HALL

Thank you for your support in making excellent resources available for teaching our students in order to create a more earth science literate citizenry!

MICHELLE HALL

Your support for geoscience education is the critical lynch point that keeps geoscience education fresh and relevant in schools around the country. Many thanks to the Directorate of Geosciences, as well, as they were the first to consider funding education to ensure the livelihood of the field.

CYNTHIA HALL

The Early Career Faculty Workshop has been immeasurably valuable to me as a faculty member. At that pivotal time in my career, as I was entering a new role as an instructor and a manager of my lab, I received insight and camaraderie from both peers and mentors that propelled me through achieving tenure and promotion. It is my hope that the support for this program continues as I have witnessed its impact as a participant and now a workshop leader. Thank you for this opportunity.

GANNET HALLAR

Signature of thanks

KIM HANNULA

Signature of thanks

**SAMANTHA
HANSEN**

Thank you for your continued support of the "On the Cutting Edge" program. Their initiatives have been extremely helpful throughout the course of my career, particularly when I first started my faculty position. Aside from the resources and programs, "On the Cutting Edge" also helps to build a great sense of community among geoscientists.

SARA HARRIS

Dear NSF - Thank you for funding "On the Cutting Edge." It was through attending On the Cutting Edge events that I first connected with the wonderful and engaged geoscience education community. The PIs of this project have done a

huge service to furthering student and teacher learning in the geosciences.

PAT HARRIS

I visit the website for On the Cutting Edge any time I am looking for new ideas or data to engage my classes. This is a tremendous resource for geoscience educators. Thank You for the support

**HILAIRY
HARTNETT**

Thank you! On the Cutting Edge completely transformed my approach to teaching and I've been taking advantage of their resources since 2004.

SYED E. HASAN

As participants in several 'On the Cutting Edge' workshops, seminars, etc. both as a learner and speaker, I won't hesitate to emphasize the great educational benefits that it has brought to the entire geoscience community. Many of the new workshops, such as 'geology and health' that were an emerging geoscience subspecialty some 12-15 years ago, have now become a well-grounded field of knowledge, with several universities offering courses and conducting research in this area. I truly appreciate the sustained support for the program and the people entrusted with managing it – thanks to both for financial support and effective leadership!

**MEREDITH
HASTINGS**

I attended the Workshop for Early Career Faculty (balancing research and teaching) the summer before I began my faculty position. It was an outstanding workshop that absolutely put me off to the right start! I have used so many On the Cutting Edge resources over the years and will continue to do so. Thank you to NSF and all those who have supported this incredible effort!!

STEVEN A. HAUCK

Thank you, NSF, for supporting the growth and development of the geoscience community. The On the Cutting Edge workshop for early career faculty was a critical part of my early development as an effective educator and researcher. I literally tell everyone I know who is starting on the tenure-track to apply to the workshop.

**ELISABETH
HAUSRATH**

I have participated in three workshops – the Preparing for an Academic Career for graduate students, the Teaching, Research, and Managing your Career workshop for early career faculty, and the Building Strong Geoscience Departments for entire departments. Each one was excellent, and well worth the time, and I recommend them to everybody I know. Thank you very much!

KAREN HAVHOLM

I wish this program had been available to me as a faculty member when I was starting out! I did get to assist in workshop leadership along the way, and that alone was a valuable professional development experience for me. I have so many

colleagues who have benefited from so many aspects of Cutting Edge opportunities. Thank you for supporting this robust program.

JODIE HAYOB

A big thank you to NSF for supporting Geoscience education! A strong background in Earth Sciences is more important than ever for today's younger population.

FRED HECK

Awesome resource! I use Cutting Edge materials in my college classroom every semester. It's the first place I go when looking for something different and meaningful to help student's understand a concept. Thank you NSF for your support of this program!

A.B. HECKERT

On the Cutting Edge workshops are invaluable to the continued modernization of the geoscience education workforce. I cherish the new connections I made at a workshop almost 10 years ago, and have encouraged colleagues to attend workshops. The curated web resources are also a spectacular resource.

MARY HEGARTY

I am not a geoscientist. I am a cognitive psychologist who studies spatial thinking and have benefitted from this program both as a participant in research groups and in attending some conferences and events that they organized. I am impressed with the breadth of thinking of

the leaders of this group and their willingness to share their spatial intelligence with us psychologists who want to study it!

MARK HELPER

On the Cutting Edge has been an invaluable resource for developing new experiential learning exercises for my GIS and Field Geology courses. I have, in turn, been able to share my own classroom exercises and experiences with colleagues, both through workshops and the web. This ability of the community to easily share best practices has certainly improved my teaching and, I suspect, that of many others too. Thank you for your continued support of this important program.

GINA HENDERSON

I attended the On the Cutting Edge Early Career Workshop the first summer of my tenure track faculty position. It was an incredible experience getting to talk with other early career faculty about common challenges, fears, and strategies for success. I still use activities that I learned about either at this workshop or from the online portal, and have always recommended this workshop to other colleagues.

DARRELL HENRY

The Cutting Edge effort is the most successful educational endeavor that I am aware of. It brought new ways of teaching and opened up a generation of enlightened geoscience educators.

ELLEN HERMAN

Signature of thanks

**CALLUM J.
HETHERINGTON**

The website was a near constant source of assistance and inspiration for me during my early career, and remains a go-to resource for ideas and activities to this day. The Early Career Workshop remains one of the highlights of my tenure-track for the structure and framework it helped me build for myself and my students. Cutting Edge is an irreplaceable institution!

**THOMAS
HICKSON**

"On the Cutting Edge" fundamentally changed my professional life and many aspects of my personal life. It brought insights into my teaching strategies that I put into practice with great success. As a workshop participant and leader, and as a contributor to many SERC exercises online, I had many deep interactions with this program. I took a deep dive. I am so grateful for what the program gave me, my colleagues in my department, and, most of all, my students!

**SHARI HILDING-
KRONFORST**

I love the Cutting Edge program! Every program attended had been incredibly beneficial. THANK YOU NSF.

TESSA HILL

Signature of thanks

WILLIAM HIRT

On behalf of my students, thank you. I was able to take part in the Cutting Edge program as both a workshop participant and facilitator. I learned a lot, had the opportunity to work with terrific colleagues and, most importantly, developed new exercises and activities that benefitted my students. In fact, I continue to use materials developed during the Cutting Edge program to improve my classes. Those materials are a great legacy for the program.

KIP HODGES

Thanks for funding an extraordinary program!

ANN HOLMES

Your funding and the excellent organization by the Cutting Edge team has been instrumental in improving my teaching. Thanks for all you do, NSF, to keep science at the forefront!

**CAMILLE
HOLMGREN**

Signature of thanks

**SAMANTHA
HOPKINS**

Thanks so much for funding On the Cutting Edge! This program was critical to the development of my teaching and research career, and gave me a community of colleagues with the same value for integrating research and teaching.

ADAM HOUSTON	"On the Cutting Edge" provided me a wonderful jump-start to my career. Thank you for facilitating this invaluable resource!
SUSAN HOWES CONRAD	On the Cutting Edge has made a significant impact on my teaching and my students' learning. Thank you!
KATE HUNTINGTON	Thanks for the Early Career on the Cutting Edge workshops - they changed my perspective as a teacher-scholar and gave me practical tools that I have built on over my career.
JACKIE HUNTOON	Thanks to everyone at NSF for all of the help improving geoscience education nationwide!
CAILIN HUYCK ORR	Thank you for supporting our community!
ALISA K. HYLTON	On the Cutting Edge has allowed my students to explore the world in meaningful ways that would not be possible without The Cutting Edge
SOLOMON ISIORHO	Much appreciation for the funding. I learned from the various workshops I participated in and I also contributed to some of the programs. Please continue to provide funding for the NAGT

activities/programs.

**DOROTHEA
IVANOVA**

Thank you very much, NSF for funding 'On the Cutting Edge'! It means so much for faculty and students who benefit from the program, esp. at universities with heavy undergraduate teaching loads and undergraduate research programs. The pedagogical tools, methods, and database 'The Cutting Edge' provides, as well as the wonderful seminars and workshops, are priceless and made me a better teacher.

ELLEN IVERSON

Because of the continuity of support over time for the On the Cutting Edge program, NSF supported an important mechanism for change in geoscience teaching and learning. Through the program, faculty transformed their philosophies about teaching and learning and found a community of practice to support ongoing learning. The community of practice produced new ways to break the cycle of content-driven curricular design. The traces of this project will lay the foundation for a more equitable and diverse future in geoscience education and beyond. No doubt this can be attributed to NSF taking the long view of funding. Thank you.

JOHN JASBINSEK

I attended the 2011 Early Career Faculty workshop, which really helped me put my teaching and research goals into perspective and chart a course for my career. I also make use of the teaching resources available regularly, which really helps me get new teaching activity ideas and saves me time in preparing great student

experiences. Thank you for supporting faculty in the geosciences!!!

LI JIN

Thanks NSF for supporting this education effort. My experience with the Early Career Faculty workshop was amazing. I developed a new course which integrates research and teaching and provides students with a transformative learning experience.

LIXIN JIN

Thank you, NSF, for your support of this early career workshop. I benefited so much from it!

LIZ JOHNSON

Thanks! I attended several On the Cutting Edge workshops, and they were greatly helpful to my development as an instructor and as a tenure-track professor.

BETH JOHNSON

I have participated in a number of On the Cutting Edge workshops over the years and they have been a great help in my career and my teaching. I look forward to continuing to use them in the future.

**KATHLEEN
JOHNSON**

Signature of thanks

ANDY JOHNSON

Thank you for supporting On the Cutting Edge. I am not a geoscience faculty, but a professor of physics. Nevertheless, I benefitted from this program at Carleton - they offered a course on systems modeling and systems thinking, and it was the springboard I needed to begin offering similar courses at my home institution.

BEV JOHNSON

The workshops and resources compiled by the "On the Cutting Edge" staff and participants have been invaluable to my teaching of environmental and global change geology at all levels. Thank you, thank you, thank you!

BRAD JOHNSON

The workshop was one of the most useful things in organizing my early career. The thing that helped most was seeing what the research/teaching balance was at a bunch of schools. It helped me to frame my early career and understand what the expectations were of me.

DAVID JOHNSTON

A great experience, thanks!

MEGAN H. JONE

Participating in and co-facilitating On the Cutting Edge completely changed how I do my job as an educator and provided me with numerous collaborators that I would never have met if it was not for these workshops!! Seriously!! Thank you so much for your willingness to help build

strong geoscience departments.

FRANCIS JONES

I especially appreciate the collegial, collaborative welcome this project has extended to Canadian associates, colleagues and partners. Advancing relevance and efficacy of geoscience and geoscience education is an urgent and global endeavor.

**EROSCILLA
JOSEPH**

Thank you NSF for supporting scientific research!

LEAH JOSEPH

Thank you, NSF, for funding this wonderful initiative! The Cutting Edge collection and workshops has made my job as a professor and geoscience colleague both much easier and much more rewarding - and has benefitted my student and their education immensely. Without these collections, most of us would have to take extra time to re-invent the wheel - to have a coherent collection of teaching materials on so many different topics in one place - has been incredibly helpful! The workshops were also always well run and effective and well worth my time to attend!

SHELLEY JUDGE

I have been a faculty member for the past 13 years, so my entire career at liberal arts colleges has been inspired by On the Cutting Edge. The professional development opportunities and

resources have genuinely made me a more creative, impactful educator. I have benefited from the generosity of my colleagues, who shared their insights, knowledge, and resources so freely. My students have benefited from my ability to bring meaningful datasets and ideas into the classroom, bringing theory to practice each and every day. Thanks NSF for your contributions to geoscience education and the next generation of geologists and environmental scientists!!

**STEPHANIE
KAMPF**

The Cutting Edge early career workshop was extremely useful for me during my start of a tenure-track faculty position. It was the only formal setting in which I learned about teaching strategies and proposal writing. The support NSF provides for this effort is a valuable investment in future scientists and educators. Thank you.

SUSAN KASPARI

The early career Cutting Edge workshop was phenomenally helpful for me when I started my position. I took the workshop the summer of 2009 before I started my academic position, and the teaching tools I learned during Cutting Edge were, I often felt, the only tools in my toolbox! I still use some of what I learned during that time. Coming from nearly a purely research background, the Cutting Edge workshop helped me on my path to become a much more skilled educator. I also recall the usefulness of reflecting on how I would balance all of the responsibilities of an academic job, along with home life. Thank you!

KIM KASTENS

The community of practice built up over the years by Cutting Edge and other NSF supported geo-ed programs is unparalleled in any other discipline of higher education. Thanks for your vision, moral support, and dollars.

ABBY KAVNER

I have used the Cutting Edge resources to help prepare my courses at UCLA – including undergraduate Earth & Planetary Materials (Mineralogy) and Plate Tectonics (undergraduate). I have also participated in workshops and contributed some exercises. Thank you for supporting the development and training of amazing scientists!

REBECCA KELLY

Thank you, NSF, for your continued support of the Cutting Edge program! It makes a huge difference for geoscience educators to have access to these amazing resources.

DAVID KENDRICK

Thanks, NSF. On the Cutting Edge is a great resource and its workshops have improved my teaching and understanding.

MARCUS KEY

Signature of thanks

JOHN KEYANTASH

I greatly appreciate the professional development provided to me by On the Cutting Edge. I started out my university career taking a weeklong summer workshop held at the College of William and Mary. When going to Virginia I did not know exactly what I had signed up for, but I quickly saw that it was a very well-structured and valuable experience for young faculty like myself. Since that time, I have also attended workshops held at the fall AGU meeting, as well as contributed to online teaching resources. NSF support for this program for 15 years has been exceptional.

**BRANDI KIEL
REESE**

Thank you for your support of this incredible program. I attribute much of my success in finding a job in academia to the Preparing for a Career in Geosciences Workshop and my continued success as a teacher-scholar to the Early Career Geoscience Faculty Workshop. These have impacted me immensely and I hope my students will one day benefit from them as well.

HALI KILBOURNE

The On the Cutting Edge program was influential in my growth from student to working scientist and the resources provided by the program were invaluable to developing my teaching skills (both in terms of course content and teaching technique). I attended 2 workshops and used the online resources extensively in my first few years as a professor. I have recommended the resources to other new faculty now that I am more senior. Thank you for

supporting such a vital program that impacts so many (students and faculty) and helps geoscience faculty spread scientific literacy to future scientists and lay citizens alike.

CHRIS KIM

As both a participant and, many years later as a facilitator in this workshop, I can attest to its transformative power and value in preparing me for my academic career as well as giving me an opportunity to reflect and share my experiences to the next generation of earth scientists and academics. Thank you NSF for impacting so many lives through this support!

MICHELLE KINZEL

Thank you so much for your efforts, dedication and contribution to geoscience education! I am a proud teacher and I appreciate all of your great work!

KARIN KIRK

The On the Cutting Edge program literally changed the course of my career. Until then I had been working in a bubble, coming up with ideas on my own. The Cutting Edge program connected leagues of like-minded colleagues so that we could all learn from each other, build off of each others' successes, and share materials and ideas. One year at GSA I recall hearing one presenter after another cite the Cutting Edge in their talks. The impact of this program has been huge and lasting. I am so appreciative for the vision of NSF to fund this program and keep it going long enough to make a permanent

difference. The program really did change the culture of the field, and of course, thousands of students have benefited from this change. Thank you, NSF, and I dearly hope that science education will remain a top priority for the USA. We need it more than ever.

JESSICA KLEISS

Thank you for supporting On the Cutting Edge! My teaching and my research has benefitted tremendously over the years from the resources they have developed, and the workshops they facilitate. This would have never happened without NSF support.

JENNIFER KLING

The Cutting Edge resources and experiences have enriched not only my life but the lives of my students. Thank you for supporting this incredible resource.

MICHAEL KNELL

Thank you for supporting the On the Cutting Edge program and workshops. I have had the opportunity to attend two of these workshops so far and have found them to be extremely informative and well organized. I wouldn't have been able to advance in my career without them. Please continue to support this fantastic program.

BESS KOFFMAN

Thank you for supporting On the Cutting Edge! I had the good fortune to attend the Preparing for an Academic Career in the Geosciences

workshop as a graduate student, and what I learned really shaped my thinking and my approach to getting a job and career planning. Now as a first-year tenure-track faculty member, I appreciate OtCE not only for its very practical help with getting a job and transitioning to being a professor, but also the amazing teaching resources curated at the OtCE website. I hope this effective, "cutting edge" program (pardon the pun) can continue to serve as a resource for our community!

JASPER KOK

Thanks NSF, for funding these wonderful workshops! They helped me better articulate my research, land a faculty position, and get a running start on it!

**TOMOKO
KOMADA**

This program helped me navigate the wild seas of academia. Thank you NSF!

ROBIN KONDER

The "On the Cutting Edge" workshop prepared me with an introduction to student-centered teaching practices that I have used in my classrooms and field courses at Western Washington University. It also prepared me with strategies to maintain a successful teaching/research balance at WWU, which is a primarily undergraduate research institute. Thank you!

KAREN KORTZ

On the Cutting Edge changed my life (that sounds overly dramatic, but it's true). Thank you for supporting it!

KAREN A. KOY

This has been an incredibly important resource for me in my early career. It helped me develop and improve both lower and upper level courses, and led to a publication on my teaching methods.

ANDREA KOZIOL

Thank you for supporting me and other colleagues in the "Teaching Phase Equilibria" workshop in March 2007, and for supporting the ensuing published webpages.

KAATJE KRAFT

Cutting Edge is largely responsible for the way I teach and the philosophy I have for the role I play in my students' learning. Were it not for the Cutting Edge program, I would likely not have my PhD, I would not have the community of collaborators and partners I have at a national level, and I may not even have stayed in the teaching profession. Needless to say, I'm a huge advocate of the program and thanks to NSF for making it possible!

**IVY KRYSTAL
JONES**

Thank you NSF!

LARA KUEPPERS

The Early Career faculty workshop came at just the right time to provide practical resources, personal advice, and a peer network as I started my career. On the Cutting Edge has been a terrific resource thanks to NSF's consistent support.

YVETTE KUIPER

Thank you for helping me become a better teacher, researcher and geoscience community member in the US. I benefited personally from the 'Early Career Faculty,' 'Strategic Persuasion,' and 'Strengthening Your Geoscience Program' workshops, and I contributed to a 'Teaching Petrology and Structural Geology' and a 'Preparing for an Academic Career in the Geosciences' workshop. Furthermore, I use the On the Cutting Edge website resources regularly for my own purposes and the program is kindly hosting the Structural Geology and Tectonics Forum websites. My graduate students and colleagues also benefit from various On the Cutting Edge workshops. The program thus has been, and continues to be, invaluable for the development of my own career and of those of the ones around me. Thank you!

MARK KULIE

As a freshly minted faculty member in a geosciences department, I truly appreciated the exhaustive information and useful career insight provided by the On the Cutting Edge program. It is a truly valuable community resource that has undoubtedly helped launch many successful academic careers.

MARIE J. KURZ

On the Cutting Edge is a fantastic resource that I have benefited from greatly. Participating in one of the career workshops during my PhD gave me confidence in preparing for an academic career and helped me bridge the gap between where I was and where I could see I needed to go. I, and everyone I know who has participated, recommend the workshops wholeheartedly. Whenever I have a teaching or career question, the On the Cutting Edge website is usually where I look first. The teaching and other web resources provided are extremely useful. Thank you NSF for your support!

BEN LAABS

This program has helped me greatly improve my teaching, and it continues to build an ever-growing network of thoughtful and engaged geoscience teachers. Thank you for supporting it!

HELEN LANG

Thank you for supporting On the Cutting Edge for fifteen years. I participated in one of their early workshops, I have used the resources repeatedly, and I recommended their workshops to my faculty colleagues. I'd like commend the PIs; this program has made a significant contribution to undergraduate education in Geology. Thanks.

**DANIEL A. LAO-
DAVILA**

Thank you for funding this project that has positively impacted the education of many students and faculty.

**JENNIFER
LATIMER**

Signature of thanks

SANDRA LAURSEN

Positive change in STEM education requires that we take the long view. Thanks for steadfast support of On the Cutting Edge and other efforts to improve geoscience education!

PRISCILLA LAWS

Thank you for all the support you have given over the years to this vital project!

ALEX LECHLER

The workshop(s) was hugely beneficial to a successful start to my academic career. Thank you!

R. MARK LECKIE

What an impactful project this has been! I'm glad to have contributed in some very small ways, but the reach, depth, and breadth of geoscience teaching materials is staggering. Thanks so much for the vision and commitment to On the Cutting Edge.

MARY LEECH

Cutting Edge resources have been incredibly valuable in my teaching at the undergraduate and graduate levels.

LONNIE LEITHOLD Thank you for supporting this important effort – it has increased the quality of geoscience teaching and helped to build strong communities of educators.

DEB LESLIE Thank you NSF for funding this program! The resources and interaction I received at the Cutting Edge workshop helped me with my job application materials and interview tips/tricks. I consider it a valuable experience that helped me get a tenure-track professor position.

JAMIE LEVINE Thank you so much for supporting professional development, learning and improving new teaching approaches, and opportunities to meet my program officers at the workshop for Early Career Faculty. I have attended two workshops through On the Cutting Edge and several virtual workshops. These opportunities have been invaluable to me and have strongly influenced my teaching in a positive way. Thanks for all of the support!

JOSEPH LEVY Thank you for supporting OCE! It's a tremendous resource for early career faculty members like me looking to expand our teaching repertoire to inspire the next generation of Earth scientists, energy practitioners, and environmental engineers.

**JONATHAN C.
LEWIS**

Dear NSF, I cannot overstate how substantial the On the Cutting Edge program has been to me and to many of my peers. The teaching resources community connections, mentoring, the sharing of best practices, to name but a few, have been quite extraordinary. As an academic geologist and as a taxpayer, I feel that investments in this program have been very well spent. Kind Regards.

ANNE LIGHTBODY

Thanks for your support of this great program, which has been invaluable in my first few years as an educator.

**MELISSA
LOBEGEIER**

Thank you NSF for funding this great program. My students thank you too as without this program I would not be the teacher I am today.

TAMMY LONG

Signature of thanks

SUSAN LOZIER

Thanks, NSF, for your support of the Cutting Edge! I had the opportunity to participate in a workshop a few years ago and found the experience rewarding. Investing in people, as well as in their ideas, is a great way to maintain a vibrant geosciences community.

MICHAEL LUCAS

Thanks NSF for funding "On the Cutting Edge" programs, I was a fortunate participant in the excellent workshop "Preparing for an Academic Career in the Geosciences." I can attest that this has been the most informative and helpful workshop that I have participated in during my Ph.D. program. Most importantly, I could tell that the faculty instructors genuinely cared about our success. Please keep funding this important resource to the geoscience community.

**ALLISON
LUENGEN**

I am now an Associate Professor of Environmental Sciences at the University of San Francisco. The On the Cutting Edge workshops helped me land this job; I started as Assistant Professor in Fall 2009. So many of my colleagues went through multiple years of job searches - I got the job I wanted, the first time around, thanks in part due to the preparation I received from On the Cutting Edge.

LAURA LUKES

Thank you NSF for your sustained support of Geoscience Education Research and professional development initiatives for geoscientists and DBERers. The support has been critical for ensuring a more diverse and inclusive community. Additionally, the professional development support offered through NSF has been the only geoscience-specific support in many cases. The many programs that I have personally participated in have resulted in several collaborative research projects and leaderships roles in the GER community that would likely not have occurred without the

opportunities for community building that NSF funded. Additionally, in my role as an administrator/professional developer in higher education, through my experience with Cutting Edge programming, I've been able to leverage the Cutting Edge professional development support model in developing support models at my own institution across disciplines.

TIMOTHY LUTZ

The geoscience department at West Chester University is presenting a poster in the "On the Cutting Edge: Fifteen Years" session at GSA. We were astonished as we took stock of the many ways our faculty, students, courses, and department have benefited from Cutting Edge workshops and other programs. Thank you, NSF

LIN MA

Thank you NSF for offering so many wonderful opportunities to junior geo scientists through On the Cutting Edge. I personally benefit tremendously from these opportunities and experiences. Best regards.

**HEATHER
MACDONALD**

Dear NSF and NSF program directors. Thank you for the many ways you have supported On the Cutting Edge. The proposal titles provide a sense of history. Combining Real and Virtual Professional Development for Current and Future Geoscience Faculty. On the Cutting Edge: Building a Culture in Which the Cycle of Educational Innovation Can Thrive. On the Cutting Edge: A Community Resource

Transforming Geoscience Education. The titles also bring back memories. Phone calls, emails, discussions, questions, encouragement, advice, Early Career Faculty visits to NSF. Joy and excitement. So many opportunities to learn. Synergies. Expanding networks. Incredible colleagues. Thanks for helping to transform our community.

**BREANYN
MACINNES**

I attended two On the Cutting Edge workshops- one for graduate students interested in an academic career and one for Early Faculty. I credit both workshops as being instrumental in giving me the tools I needed to get my current job (Assistant Professor at Central Washington University) and to be successful at it. Thank you NSF for sponsoring these programs!

ROBERT MACKAY

Thank you for supporting the On the Cutting Edge workshop series. I have had the chance to attend 5 workshops over the years and each has given me new ideas to use in my courses, connected me with like-minded colleagues, and reinvigorated my professional life.

**CATHERINE
MACRIS**

Thanks for supporting this wonderful service!

BRIAN MAGI

I attended the Workshop for Early Career Geoscience Faculty in my 2nd year as an assistant professor in an interdisciplinary geography

department with a balanced teaching and research mission. Being in the same room as other early career faculty who had a wide spectrum of academic responsibilities related to the breakdown of teaching-research-service helped me better understand how my academic niche fit in with academia in general, and helped me identify gaps in our educational system that I continue to work on even now. Four years later, I am now a tenured faculty member of my university with a vision for how important and wide-ranging geoscience education is, how important the planet is to so many students, and how I can bring my own research into the classroom to encourage a diverse future workforce. The Workshop for Early Career Geoscience Faculty helped me crystallize my vision, and NSF funding helped make the opportunity a reality for me. Thank you.

KATE MAHER

I have the best job in the world but I would not be here if it weren't for the Cutting Edge professional development workshops. Thank you for supporting an amazing and vital program.

MARTHA MAMO

Signature of thanks

**CATHRYN
MANDUCA**

Jill, Keith, Myles, Dave, Jeff, and Peter, I have grown up as a professional over these 15 years. Cutting Edge was the grant that launched SERC. When we got news of funding I hired Sean. It is hard to remember back to all of the things we

had to do for the first time to launch this program and all of the related activities that have come after. Thank you for your patience with the young, naive, assuming, and very impatient early me and for all the support for Cutting Edge and all that followed through the years. I am proud of what we (NSF, the CE PIS, other PIs and innumerable leaders, NAGT, the geoscience education community) have been able to do together creating a supportive environment for geoscience faculty at all kinds of institutions, strengthening geoscience and environmental science departments, engaging societal issues, and strengthening learning for all students. We wouldn't have gotten started on any of it without you. -- THANK YOU.

**MICHELLE
MARKLEY**

I have grown so much from the Cutting Edge seminars, and the website is always helpful. Thank You NSF and SERC.

PAMELA MARSH

Signature of thanks

**STEPHEN
MARSHAK**

On the Cutting Edge has had a huge impact in bringing new educational concepts and technologies to the attention of the geoscience education community, and in bringing visibility to geoscience teaching in general. The role of NSF in supporting this endeavor is much appreciated.

SCOTT MARSHALL

This resource was super valuable especially when I first began my career as a faculty member. Thanks!

ELLEN MARTIN

On the Cutting Edge has provided excellent teaching support for geoscientists over the years. I have taken and helped teach some of their courses. I have encouraged new faculty and students in my department to take advantage of their courses, and I use their excellent online resources. The funding this group received from NSF has been returned many times over in terms of better prepared academics who are introducing geosciences to college students more effectively.

JON MARTIN

Thanks for supporting my participation in two workshops: Teaching Mineralogy and Teaching Hydrogeology. Both were outstanding and really improved my teaching skills.

JULIE MASURA

Thank you so much for the many training opportunities over the years. Each experience has enriched my teaching on campus.

**CHRIS
MATTINSON**

I greatly appreciate the care and effort the organizers put into the geoscience faculty early career workshop that I attended in 2009; I found it very valuable. I also found the On The Cutting

Edge teaching materials to be helpful as I created new classes as a new faculty member.

JULIE MAXSON

Thank you NSF! The On the Cutting Edge program has been a steady source of new ideas, inspirations, networking opportunities, and teaching resources for most of my career. My work to educate undergraduates about the earth system would have been much harder for me, and probably less valuable for my students, without it.

LEAH MAY VER

Signature of thanks

**DAVID
MCCONNELL**

I can't imagine what the geosciences would look like today without the community of friends and colleagues generated by the On the Cutting Edge program. It has given me an opportunity to learn from expert colleagues, to meet peers and future research team members, and to find a place to share resources we created.

BETH MCCLELLAN

On the Cutting Edge has been such an awesome program! The resources and workshops have enhanced the teaching efforts of countless geoscience faculty. Thanks SO much to everyone who envisioned and implemented this program!

JIM MCDOUGALL

Signature of thanks

ALLEN MCGREW

Thank you for supporting On the Cutting Edge. Cutting Edge programs are the most valuable educational resource I know of in the Earth Sciences.

**FRANCESCA
MCINERNEY**

Thank you NSF for the opportunity to attend On the Cutting Edge Workshops. I have attended the phd/postdoc workshop, the early career workshop, and educational workshops. They have been superb. The mentorship and support along with professional insights I have gained have been invaluable in helping me to advance my career as a woman in geoscience. Thank you

ROSE MCKENNEY

Signature of thanks

**KIRSTEN
MENKING**

On the Cutting Edge has been a real gift to those of us in the Geoscience Education Community. I have utilized many materials developed by others, I have posted on the website, and I have contributed my own materials. I have also benefitted tremendously from workshops created by the program. Thank you so much for your support!

ANDY MICHAEL

I had the chance to teach part of an On the Cutting Edge class and I appreciated the opportunity to share ideas with my colleagues to

use in their own classes.

HOLLY MICHAEL

I participated in two early career workshops with On the Cutting Edge and I regularly use the resources provided on the web. The program helped me develop teaching and research strategies that allowed me to be successful as a tenure-track faculty member through tenure, and I still use them mid-career. NSF and the On the Cutting Edge program have provided an invaluable resource to the community.

**BRIAN MICHAEL
HYNEK**

Thank you for supporting this valuable program. I have hosted and participated in several of the workshops. The website is the first place I go when looking for innovative ideas in teaching geosciences to my students.

ELEANOR MIELE

It was a pleasure to work with the On The Cutting Edge organizers and participants. I'm sure my teaching improved and that I was able to support positive change at my college with the help of the program. Participating in On the Cutting Edge improved my teaching and our college's geoscience education programs. Thanks.

**GRETCHEN
MILLER**

My first experience with On the Cutting Edge was attending the June 2005 Early Career Faculty Workshop. I was in my first couple of years teaching at a community college after working as a professional geologist, and I did not know a lot about education. The workshop taught me new

vocabulary like "think-pair-share" and "rubric." It was an amazing and eye-opening experience, and it plugged me into a network that has been incredibly supportive as I have grown in this profession. Now I'm the Principal Investigator of an NSF grant, and I'm not sure that would have happened without my participation in On the Cutting Edge. Thanks for supporting the program all these years!

KITTY MILLIKEN

Thank you, NSF! You funded my efforts to develop teaching tools for petrography and then The Cutting Edge helped me to distribute those materials to a bigger audience. Those materials remain available through a society publisher and have helped students all over the world, in both academia and industry, learn and apply petrography. Research and industry efforts related to energy security and CO2 sequestration are benefiting because you chose to support education in this very basic area of Earth Science.

ELENA MIRANDA

I attended both the 'preparing for an academic career' and 'early career' workshops. The former was instrumental in preparing me for the job search, and the latter gave me concrete plans and the confidence to succeed once I got a tenure-track job. Thank you for supporting all of us.

EUAN MITCHELL

On the Cutting Edge was, and continues to be, critical to my professional development - thank you NSF.

SARA MITCHELL

Thank you for your support of the On the Cutting Edge program. I use these teaching materials frequently – it's the first place I turn when I start developing a new assignment or laboratory. Just the other day, a rep from a for-profit journal (JOVE) stopped by to talk to me about their new environmental science and geoscience teaching materials, and I basically said, "you should check into this SERC stuff... they've basically already done what you are trying to do, but it's free, and was generated from within the geoscience community." The fact that all these materials are available free of charge to anyone is extremely valuable.

DAVID MOGK

To EHR/DUE AD, DD, and Program Officers,
As a co-PI of the On the Cutting Edge program, I would like to extend my sincere thanks for the 15 years of support from DUE. The Cutting Edge program has provided the architecture to support a sustained community dedicated to excellence in geoscience education. Through the CCLI/TUES programs, we have incorporated core aspects of the DUE mission including faculty professional development, curriculum development, assessment of academic programs and of student learning, broadening participation in the geosciences, integration of research and education, use of new technologies in support of STEM education, development of digital library methods to develop and sustain resource collections for community use, and incorporation of research on learning. We developed an ethic of contributing, sharing, and reviewing resources that is unprecedented across the STEM

disciplines, and we have established communication networks that help sustain support for individuals in the community beyond the immediate Cutting Edge events. We have also worked to leverage the best, up-to-date science into our programs to leverage the investments made by our colleagues from the Directorate for Geosciences. And we have worked to share our experiences and services with sister disciplines in support of integrated STEM education. In all cases, we have attempted to be responsive to immediate community needs, and at the same time, to provide leadership by providing the vision to engage new emerging advances to support STEM education. All of this could not have been done without the sustained support (confidence and trust) placed in us by NSF/DUE. Over the past fifteen years we have had over 600 young faculty attend our Early Career workshop series, over a quarter of geoscience faculty nationally have personally attended a live or virtual Cutting Edge event, and we have developed a peer-reviewed teaching activity collection with over 2000 entries. The foundations of this work were born from the NSF/DUE Shaping the Future of Undergraduate SMET Education, was further developed through the vision of the DLESE/NSDL digital library initiatives, and contributed to new understanding of effective practices in faculty professional development. This work was recognized by AAAS as being one of the inaugural recipients of their Science Prize for Online Resources in Education (2010). The Cutting Edge portfolio will continue to serve the community as management is being transferred to the National Association of Geoscience Teachers. This is a legacy that is enduring, and

we hope NSF will also take great pride in the products of the investments made in Cutting Edge. We are profoundly grateful for the support that NSF has provided to make the Cutting Edge project such a success.

**BILL
MONTGOMERY**

OCE has been directly responsible for keeping our University's geoscience education relevant and up-to-date. Thanks!

**ALEXANDRA
MOORE**

Geoscience education has never been more important; many thanks for NSF's enthusiastic support!

**SADREDIN
MOOSAVI**

Thank you to NSF for granting funds to the Cutting Edge program whose organizers have opened doors for faculty at small institutions or those not in tenure track positions to support their professional development!

JEAN MORAN

On the Cutting Edge was a great investment. We use it frequently.

DAN MORGAN

Thank you for all of your support of On The Cutting Edge over the years. This program has been instrumental in my professional development, and it has been a real community of support as my career has advanced. The

library of class assignments and network of connections have been a tremendous help in developing my own courses and research projects. The geoscience community is especially supportive and collaborative among the sciences, and On The Cutting Edge is a shining example of the way that geoscientists work together to help each other and the earth.

THOMAS MORRIS

It was an early great boost that was much appreciated!

**JAMES
MUROWCHICK**

I participated in the Geochemistry & Mineralogy Cutting Edge workshop, and I have been using the many tools produced and available on the Cutting Edge website ever since. The exercises, information packs, and other tools made available have been tremendously helpful to me and my students in my mineralogy, geochemistry, petrology, and optical microscopy courses. Such a concentrated compilation of readily-accessible materials would not have been possible without NSF support. Thanks for the support.

DAN MURRAY

Cutting Edge has been of great help to our NSF-funded geoscience efforts in three ways: 1) It provided us with a venue for disseminating our "investigations" to a wider audience than would have otherwise been possible; 2) We have used CE investigations "as is", as well as basis for developing our own materials; and 3) Several of

our geoscience educators have benefited from attendance at CE workshops.

PAUL MYROW

I would like to add my voice to thanks to NSF for helping to fund this work.

ELISABETH NADIN

I have benefitted from On the Cutting Edge over the years in many things: the early career workshop, the "building stronger geoscience departments" visiting workshop, and their terrific collection of online resources. Thank you for funding On the Cutting Edge!

ELIZABETH NAGY-SHADMAN

On The Cutting Edge is a fantastic resource for geoscience faculty at two-year colleges.

ALEXIS NAVARRE-SITCHLER

Thank you for your unwavering support of junior faculty career development!

PAM NELSON

Thank you for your continuing support of geoscience education. Both I and my students have benefited greatly from the training and services supplied by On the Cutting Edge.

BECCA NEUMANN

Thank you for supporting On the Cutting Edge. I attended the Early Career Faculty workshop and found it invaluable as I started my faculty career.

The guidance and advice I gained at the workshop helped me set up a successful trajectory. I still leverage many of the teaching and mentoring techniques that I learned at the workshop.

BOB NEWTON

Thanks for your support of this awesome program that provides faculty with the resources needed to produce "state of the art" course content!

CARMEN NEZAT

I have attended several On the Cutting Edge professional development programs and used the on-line activities. It's been a great resource for implementing new teaching activities, increasing student involvement in classes, developing undergraduate research projects, and finding peer support among other faculty members. Thank you for funding On the Cutting Edge!

ANTHONY NGUY-ROBERTSON

Signature of thanks

JEFFREY W. NIEMITZ

There can be no question that NSF funding has been crucial to the furtherance of basic science in the US, for sheer impact to thousands of students, the On the Cutting Edge programs have undeniably increased overall earth science literacy by helping teachers teach more effectively. What could be more important than

having the next generation understand more fully how the Earth works and how we can protect it for generations to come.

RACHEL O'BRIEN

The Early Career Workshop I attended ~15 years ago was a game changer for me. It has been wonderful to see so many other colleagues utilize the professional development opportunities provided by this NSF grant. Geoscience faculty, individually and collectively, have been made stronger and more vibrant professionals because of this support. Thank you!!!

**ADRIENNE
OAKLEY**

I attended two On the Cutting Edge workshops. I credit the first (Preparing Future Faculty) for leading to my current, tenured job. The Early Career Faculty workshop provided me with tools I use in my classroom and with colleagues outside of my university. Thank you for supporting these extremely worthwhile programs.

**FRANCISCA OBOH-
IKUENOBE**

Thanks for funding this great program.

**SUZANNE
O'CONNELL**

Thanks for supporting this educational effort. I have participated in several workshops and they definitely helped improve my teaching. They also created a support network for those of us interested in improving geoscience education.

PETER ODUOR

I did attend an early Cutting Edge workshop and I had a blast. It was well organized, informal, informative, and conducted in an amiable atmosphere. Cathy and Dave were great hosts and very knowledgeable. Next year, we hope to send one of our instructors to the conference. I formed a great network and we collaborated with another Cutting Edge participant on an NSF proposal. Thank you NSF!

**DANIELLE
OGURCAK**

Thanks, NSF! I attended The Preparing for an Academic Career Workshop, offered a couple years while I was still a graduate student. The workshop was a great experience and definitely helped prepare me for the teaching I've done since I graduated. This was such a unique opportunity in that it offered assistance in navigating academia in the geosciences while giving future educators the tools they need to be successful in the classroom!

CAROL ORMAND

Signature of thanks

MARCY OSGOOD

Signature of thanks

ZEB PAGE

"On the Cutting Edge" helped me become a better teacher. I depended heavily on it in my first few years as a faculty member, and I continue to use it as a resource as I update my courses.

CINDY PALINKAS

Thank you for supporting this critical work! I've attended the Early Career and Geoethics workshops, both of which substantially contributed to my career development. The archived course materials have become my go-to source for examples and activities in many of my classes. I hope the support will continue for many years to come!

WENDY PANERO

I discovered On the Cutting Edge after my first term teaching as an assistant professor in 2005. I'd struggled in organizing my course to meet the needs of my students. I then discovered On the Cutting Edge's Course Design Tutorial, which taught me how to think about course design and to shift my perspective on what is successful teaching. On the Cutting Edge is now my first stop when thinking about introducing a new exercise or approach to my teaching.

ALAN PAUL PRICE

Thank you! I have been to any number of teaching oriented professional development workshops, conferences, and meetings over the year funded and put on by any number of entities. Many in the University of Wisconsin system, but also by various geological and geographic professional groups and entities — that probably comes to 40 major and minor workshops and meetings over 30 years. But professional development through SERC and the Cutting Edge has been by far the most useful of any of them. I learned so much. I used the material in every class whether it was content or

pedagogy. I very much hope that I can continue to use their resources until I retire! Again, my heart-felt thanks!

**SARAH
PENNISTON-
DORLAND**

Thanks for the support of On the Cutting Edge. I have benefitted immensely from the online teaching resources and the Early Career Geoscience Faculty Workshop!

MICHAEL PERFIT

Thanks so much for supporting our research, education, and teaching.

DEXTER PERKINS

The Cutting Edge Program has really had a major impact on me and many other teachers across the country. It is really impossible to overstate its significance. So, thanks for providing the support necessary to make it happen.

**PATRICIA
PERSAUD**

Signature of thanks

EMILY PETERMAN

Thank you for supporting the dissemination of excellent teaching activities, informative guides, and extensive resources. Your support has fostered a supportive community that champions efforts to improve teaching across many disciplines. These resources have helped each and every one of us achieve the larger goal of broadening participation in the sciences and

better preparing our students for their future careers. Thank you.

**ERIN PETERS-
BURTON**

Thanks, NSF. I first worked with Cutting Edge almost 10 years ago and I have sustained these professional connections over that time. I feel very fortunate that I was able to participate in this project!!

MICHAEL PHILLIPS

Thank you very much for the opportunities provided to me by "On the Cutting Edge" workshops as well as the subsequent materials posted online.

JENNIFER PIATEK

I've had the opportunity to participate in the Early Career Workshop, a traveling workshop at my university designed to improve our department, and the Earth Educators' Rendezvous – all of them have had a significant impact on the way I approach my research and teaching... I would not be as successful as I am without these opportunities - many many thank yous for supporting them!

JEFFREY PIGOTT

Signature of thanks

SCOTT PIKE

Thank you for supporting the On the Cutting Edge program. It's been some 14 years since I

attended my first workshop and I still use the tools and strategies I learned to promote geoscience learning with my students. The program provided a sound foundation from which I have built a successful career in higher education.

ROY PLOTNICK

The Cutting Edge has been invaluable to my development as a geoscience teacher, even after decades in the university classroom. Thanks to NSF for your support of this.

JEANE POPE

The content and contacts that I learned and made during my many positive experiences with "On the Cutting Edge" are beyond measure. I am particularly pleased that I have been able to use these powerful, transformative experiences to help support women and other under-represented populations as they pursue careers in the geosciences. Thank you!

**MATTHEW
POWELL**

Signature of thanks

**BETH PRATT-
SITAULA**

The Cutting Edge project has transformed the way so many geoscientists teach and collaborate on teaching. It has had a huge impact that continues to this day in a broad range of other earth science teaching-related projects. These have grown out of the partnerships developed during Cutting Edge workshops and through

increased general knowledge and appreciation within the earth science community for the science of teaching science.

RENE PRICE

I attended one of the first workshops on how to be a Geology Professor in 2002 when I first started my career as an Assistant Professor. I applied many of the lessons I learned at that 1 week workshop throughout my career. Since then I have received tenure, been promoted to Full Professor and now serve as Chair of my department. Thanks NSF for funding this great program.

**SARAH
PRINCIPATO**

I am so very grateful that I had the opportunity to attend the Early Career workshop led by Heather Macdonald et al. This workshop played a huge role in my development as a faculty member. I continue to employ active learning techniques that I learned at the workshop, and I learned ways to effectively conduct publishable research with undergraduate students. The informal sessions on work-life balance were helpful, and increasing my network of colleagues was an added bonus. I think that this discipline specific workshop is extremely useful, especially since I am the only geologist at my institution. Thank you so very much Heather and NSF for funding!

SIAN PROCTOR

Thanks NSF for supporting geoscience education. You rock!!

**WILLIAM
PROTHERO**

Thanks for supporting Cutting Edge. A great resource.

IGNACIO PUJANA

This program is a very important resource for teaching sciences, as a repository of best activities and a formation center.

**LINDI
QUACKENBUSH**

I took a course through the On the Cutting Edge Program early in my teaching career. It fundamentally changed the way I teach and engage my students and most definitely raised both student satisfaction and attainment of learning outcomes. I am grateful for the support of this program.

TRACY QUAN

Many thanks to the NSF for sponsoring science, scientists, educators, and the programs that help scientists be better scientists and educators. The On the Cutting Edge program has made a big difference in my career, and I hope others have the chance to experience the benefits.

JANI RADEBAUGH

Thank you for supporting this valuable program. The things I learned, and colleagues I met, during the program are what helped me secure tenure and my place in the academic planetary science profession. Thank you!

**LAURA
RADEMACHER**

Thank you NSF for your continued support of the "On the Cutting Edge" workshops. I've participated in many over the years, and each one has been critical to bringing my performance as a Geoscience professional to the next level, regardless of whether I was in the role of participant or facilitator. In particular, the Early Career Workshop has had a lasting impact on me in terms of encouraging me to think strategically about my goals and career and giving me the support to take risks and try new approaches and innovations in scholarship and teaching. I am still in touch with peers I met when I attended the Early Career workshop as a participant, and I am inspired by each new group of Earth Career faculty that I meet as a facilitator. I have great hope for the future of Geosciences, in no small part because of the "On the Cutting Edge" programs.

FEDERICA RAIA

Thank you for supporting such an enriching program. I think all of us faculty have to thank this program for helping us think and teach in a different and more powerful way.

SARA RATHBURN

I attended two On the Cutting Edge workshops and assisted with one. All were of excellent quality and provided important and useful information for me during different times in my career. I regularly access those resources and am in contact with several colleagues I met at the workshops. Thank you for the support, and keep up the good work!

TODD RAYNE

Thank you for your longtime support of a program that has made an enormous difference in how I teach and how my students learn!

JASON RECH

Thank you NSF! This program was very beneficial and I still use some of the things that I learned in this workshop. Thanks.

**CHRISTINE
REGALLA**

I cannot thank you enough for supporting the On the Cutting Edge workshops for early career faculty. It was hands down the most useful and impactful experience I have had in starting my faculty career. It has helped me implement new and effective teaching tools, time management tools, and student management/advising strategies, and has helped me find a network of colleagues that I can turn to for support. I recommend it to everyone I know, and I still have the booklet they provided as a reference on my shelf.

**JAMES S.
REICHARD**

Signature of thanks

LINDA REINEN

Thank you for making "On the Cutting Edge" possible. It is a tremendous resource for high-quality teaching materials and provides excellent opportunities for learning from each other through the workshops offered. I've participated in several workshops and always find them

engaging, informative, and incredibly valuable for connecting with like-minded educators. In addition to the workshops, I regularly recommend the online resources to faculty early in their career. Thank you for making this all possible!

PHIL RESOR

Thanks NSF! On the Cutting Edge Early Career and Teaching Structural Geology workshops really helped launch my academic career. My students still benefit from the model of engaged teaching and learning modeled at these workshops.

ROBERT RHEW

I appreciate "On the Cutting Edge" for timely support when I was a new faculty member, and I am grateful to the NSF for supporting this valuable program. The program has extensive reach across the country, and it provides a unique and fundamental service to the academic community.

DALLAS RHODES

Cutting Edge came at a crucial time for the geosciences and was crucial in the transformation that has occurred. The focus on carbon and mineral resources has shifted to Earth's past, present, and future environment.

**MATHIEU
RICHAUD**

Dear NSF, Many thanks for funding "On the Cutting Edge" to the extent that you have. I have

used, and reviewed, many activities in past years Hands-on activities are a better way to teach undergraduates about earth sciences than just lecturing. Thanks again.

**DELORES
ROBINSON**

"On the Cutting Edge" has been useful to me and I know my students are thankful because the programs have helped me become a better teacher.

KAT ROCHEFORD

This program has empowered me as an emerging academic to be more effective in educating our next generation of scientists. Thank you for your support!

MAISA ROJAS

I would like to thank NSF for supporting this programme. I am a climatologist from Chile and through online courses I have made much use of your workshops, webinars, and resources in my teaching!

TARA ROOT

My experiences with the early career workshop were fantastic. The workshop helped me hit the ground running and having the opportunity to connect with other early career faculty and talk about our similar experiences and concerns was great. I also regularly use the online teaching resources to help improve my classes. Thank you for funding a very impactful program.

LAURA ROSALES

Thank you NSF for supporting the Cutting Edge. I attended a workshop as a PhD student that helped me define my professional career. Now as a professor I benefit from the material they created, including webinars, conferences and the InTeGrate material. You helped form a community of Geosciences. The benefit of these materials will trickle down to our students.

Signature of thanks

BILL ROSE

**SARAH
RUBINFELD**

The Early Career Faculty workshop was an incredibly valuable professional development opportunity. Thanks so much for your support of these programs.

**KATHERINE
RYKER**

Thank you so much for supporting On the Cutting Edge! I've received essential professional development and resources early in my career, which has made a world of difference to me and my students.

PETER SAK

I have utilized On the Cutting Edge programs since their inception. Early on, On the Cutting Edge gave me the confidence as a newly minted PhD to cross from student to faculty member.

Now I am contributing exercises and paying it forward to future generations. Thanks to NSF for the sustained support of this wonderful program which has cultivated a vibrant community at both in person workshops and on-line forums.

**MICHAEL
SAVARESE**

On behalf of Florida Gulf Coast University, I want to thank NSF and On the Cutting Edge for their collective support of quality undergraduate education in the earth and environmental sciences. FGCU opened around the same time as "Cutting Edge" began its operation. We, as a state comprehensive university committed to environmental stewardship and literacy, developed an innovative curriculum. On the Cutting Edge has helped immensely with this and with the professional development of our faculty.

MARY SAVINA

NSF support for this program has allowed me to introduce many topics and activities into my geoscience courses from fields in which I have little direct background. An example is the Geology and Human Health resources, which started with materials collected for a Cutting Edge workshop and developed into many more examples of assignments, resources, etc. The Cutting Edge sites have helped improve my teaching, far more than any other set of resources.

**AMANDA
SCHMIDT**

The workshops I attended through On the Cutting Edge and educational materials I regularly use from SERC have been key to developing me into the teacher I am today. In addition, the Preparing for an Academic Career and Early Career Geoscience workshops were fabulous resources when I was a senior graduate student and junior faculty member. Whenever I am planning a class, the first thing I do is see what resources I can use from the SERC website. My GIS class was initially modeled after materials posted on the website and now I am able to give back by sharing my lessons with others. Thank you for your support in developing this amazing resource.

MARK SCHMITZ

Signature of thanks

RON SCHOTT

Thanks, NSF. I've learned a great deal from the NAGT On the Cutting Edge Workshops and I hope my contributions have been useful to others as well.

**MADLINE
SCHREIBER**

Thank you for providing funding for the On the Cutting Edge series. I was a participant in the Early Career Workshop in 2000, the summer after I started as an Assistant Professor. 17 years later, with 2 promotions under my belt, I look back at that workshop and remember how much relevant advice I got on how to manage an academic career. I also met amazing people from all over the country who are now my friends and

colleagues. I am thankful for the opportunity to be part of that.

DEREK SCHUTT

Thanks NSF! The Cutting Edge program gave me invaluable help in learning how to succeed in the academic life, and their mentorship helped me better understand the sometimes perplexing intricacies of academic culture.

BRANDON SCHWAB

The multiple Cutting Edge programs that I participated in were pivotal to my personal and professional development and that of my programs. The legacy will last for many, many years into the future. Thank you for the support.

BENJAMIN SCHWARTZ

Thank you, and thank you again. This workshop helped me in many ways and allowed me to take advantage of opportunities that I either couldn't have worked out on my own, or never even knew existed. 10 years later and the workshop is still helping me. I'm sure it will continue to do so for many years to come. Best wishes and my most sincere appreciation.

PETER SELKIN

I've been using On the Cutting Edge materials and participating in their workshops for over ten years now. I couldn't have made a career out of teaching without the program! Thanks, NSF, for supporting Cutting Edge and programs like it.

STEVEN SEMKEN

NSF has made all the difference in the world to the intellectual viability and impact of geoscience education, and On the Cutting Edge exemplifies this. As a co-leader or co-facilitator of some Cutting Edge workshops and Earth Educators' Rendezvous, and as a beneficiary of these and more, I applaud and thank NSF for its indispensable support!

JACOB SEWALL

Cutting Edge workshops fill a huge void in the graduate education of scientists in helping to prepare them for the realities of their careers as academics, not simply researchers. I greatly appreciate the opportunity to participate in Cutting Edge workshops as both a student and instructor.

HATIM SHARIF

Signature of thanks

AMY SHELDON

Signature of thanks

KAREN SHELL

Signature of thanks

CINDY SHELLITO

Signature of thanks

**STEPHANIE
SHEPHERD**

Many of us fondly refer to the Workshop for Early Career Geoscience Faculty as Professor Camp. That week allowed me the time to consider my professional goals and career trajectory. After lengthy conversations with my peers and the workshop leaders, I realized my current position at a PUI was not working for me and I would be happier at a different type of university. Within a year I accepted a tenure-track position at a larger state university with a graduate program. Four years in, I am thrilled with my job. I would not have had the guts or motivation to apply for a more research focused position without my Professor Camp experience.

**MICHAEL
SHERIDAN**

NSF, I appreciate your forward-looking approach to Geosciences and the support of geo-people at all levels and backgrounds, from cutting edge to beginners. Thank you for support throughout my career.

ALYSSA SHIEL

Thank you for supporting On the Cutting Edge. I participated in programs as a post-doc and new faculty member. They helped me to confidently navigate into a faculty position and through my early years in the position.

**RENE SHROAT-
LEWIS**

Thank you for supporting science and science education!

**LINDSAY
SHULLER-NICKLES**

Thank you for funding this influential program that helps support geoscience educators throughout their career. In particular, I have participated in the Workshop for Early Career Faculty and often call upon the SERC resources for development of my geoscience courses.

ROBERT SHUSTER

Thank you for your support of this phenomenal program. It has helped me and my colleagues in our Department become better instructors and our students better geologists!

**FREDRICK
SIEWERS**

Thank you so much for supporting On the Cutting Edge! The program has excellent resources for geoscience educators. On the Cutting Edge has really made a difference!

**CHRIS
SIMONIELLO**

Thanks NSF! Hope you realize how worthwhile On the Cutting Edge is. Nearly 13 years later, I continue to use many of the skills, resources, and professional networks acquired with this early career training. Exponential return on the investment!

CHRIS SINTON

On the Cutting Edge and SERC have been one of the most valuable resources that I have used in my 10 years of teaching undergraduates. I have participated in several workshops and helped create one of the InTeGrate modules, all of which have made me a more effective teacher.

MONA SIRBESCU

Thank you for making these community-building opportunities possible!

LEONARD SKLAR

A giant THANK YOU to everyone at NSF who has had a hand in supporting On the Cutting Edge. This program has made a huge difference for me, for so many of my colleagues, and especially for our students. I have participated in one week-long in-person workshop, and one online workshop. Both were among the very best training experiences I've ever had, and for sure the best training for teaching and designing learning opportunities for students. I've also made use of the online resources well over a hundred times, attended AGU sessions, and thanks to this program, made many new (and deepened existing) collegial relationships – all around teaching Geoscience in new and better ways. The benefits for our students must be enormous – and well worth every bit of the investment you've made in this program. Thank you again for supporting On the Cutting Edge.

**SUZANNE
SMAGLIK**

Dear NSF, Words can hardly express my thanks for your support of the geoscience On the Cutting Edge program. As a professor in an isolated rural community college, I had no community of peers to borrow and/or share ideas with, from whom to learn to be a better instructor, or to appreciate the quantitative nature of education research. Without your support I would not have been able to attend as many workshops and activities as I have, and I

would not be the successful, award-winning teacher that I am today. Thank-you so much!

JESSICA J. SMAY

I've attended several On the Cutting Edge workshops, and my teaching has been strongly impacted by what I learned during those very formative years early in my career. I know my students have learned more and have enjoyed learning more than they would have had I not had the opportunity to attend these workshops. I love teaching and creating new curricula using the skills that I've developed through my experiences with On the Cutting Edge. Thank you!

LINDA SOHL

I've enjoyed participating in On the Cutting Edge over the years – the workshops have offered a great opportunity to share education interests and ideas with colleagues in ways that I wouldn't normally have the chance to do.

LEEANN SROGI

The Cutting Edge workshops were just the workshops I needed when I needed them! They enriched my teaching and my students' learning for years – benefitting over 1000 students. They inspired new directions of research and collaboration – fully one-third of my publications in the past 20 years come out of these workshops. The Cutting Edge made me a better teacher and scholar. THANK YOU!

**COLLEEN
STAPLETON**

In 2003, I began teaching in a university with no other geoscientists. With the help of resources from Cutting Edge, I felt that I had good quality support and my own personal faculty development in teaching. I felt connected to my discipline and that I had colleagues who were concerned with improving geoscience teaching.

**JADE STAR
LACKEY**

Thank you for supporting On the Cutting Edge! On the Cutting Edge has spanned my entire professional career. It's great to have had it as a resource since participating as a grad student in my first workshop in 2003. Thanks!

DAVID N. STEER

The impact of Cutting Edge programs on my professional development was immense. I attended my first Cutting Edge workshop in the second year of my first tenure-track position. That workshop, and those I subsequently attended, changed my entire outlook on teaching and learning. I found mentors and collaborators through my interactions in Cutting Edge programs. I can say without reservation that I was promoted early on two occasions (from Assistant to Associate) and Associate to Professor, due largely to those collaborations. Thank you to NSF for have the foresight to see this program was needed and for the support you provided over the past decade and a half. I was fortunate to benefit from Cutting Edge programs and products. I hope NSF is able to fund similar programs for future faculties.

ALLISON STEINER

I attended two workshops held by Cutting Edge - (1) Preparing for your Academic Career and (2) the Faculty workshop on teaching, research, and managing your career. I frequently share the resources from these workshops with my own students and colleagues, and when I look back on the notes I can see how much these workshops informed my career trajectory. It was incredibly informative with regards to teaching and mentoring students. Thank you for supporting these programs and giving new faculty these resources to rely on!

DAN STEPHEN

I've had the good fortune of having several experiences with "On the Cutting Edge," and these programs have greatly improved my effectiveness as a professor, especially as a teacher. This has ripple effects with the thousands of students who have benefitted from higher quality learning experiences. In my opinion, this is exactly the sort of high-impact investment that the NSF should fund. Many thanks for allowing me to be a part of it!

LIANE STEVENS

Without a doubt, On the Cutting Edge has had an incredibly large and positive impact in the geosciences. I have participated in several workshops, contributed to the website, used the web resources, and recommended workshops and resources to many colleagues and students. These workshops have influenced my teaching, research, and career for the better, and as a result their influence has rippled out among students

and the larger geoscience community. I simply can't imagine life without On the Cutting Edge. Thank you, NSF!

**MICHAEL
STEWART**

Signature of thanks

NEIL STILLINGS

It was a pleasure and honor to work on the interdisciplinary teams that worked to bring research on learning from the cognitive and learning sciences to the practice of geoscience education. On the Cutting Edge is one of the most successful efforts to improve undergraduate science education, and, obviously it would not have been possible without the support of the NSF.

JAMES STONE

Thank you for providing funding for this outstanding service to our profession!

MARINA SUAREZ

Signature of thanks

SUSAN SULLIVAN

Thank you NSF. This program has been so beneficial to those who want to pursue an academic career, early career faculty, and those who wish to improve their teaching. Your investment has improved the experience for countless students and made many faculty better at their jobs.

**DAVID
SUNDERLIN**

Thanks so much for the support of these valuable programs. Having taken part in 3 of them early in my teaching career, I can confidently say that they have positively shaped how I teach and how students in my geoscience courses learn.

**KATHLEEN
SURPLESS**

While I can point to specific workshops that have clearly helped my career, most notably the Early Career Faculty workshop, my 14-year involvement with On the Cutting Edge has provided so many intangible benefits that I can only begin to appreciate them now. These include the network of faculty I have developed through On the Cutting Edge, the new ideas and perspectives I've gained, the opportunity to learn from others even (especially!) as my roles shifted from workshop participant to workshop facilitator and leader. Thank you, NSF, for recognizing the tremendous value of this program and providing the needed support through the years.

KEVIN SVITANA

It was a great opportunity for help in my early career. It continues to be a great resource for the geoscience community.

SUSAN SWANSON

I have participated in several On the Cutting Edge workshops, and all have made a very positive impact on my teaching. From my early days of teaching (Early Career Workshop) to honing my presentation of advanced topics (e.g.,

Hydrogeology, Geomorphology), On the Cutting Edge has been instrumental in my career as a geoscience educator. Thank-you!

MARK SWEENEY

This has been a great resource. I appreciate that NSF is willing to support programs like this.

MIMI SZETO

Thank you. This is an excellent program.

**MELANIE
SZULCZEWSKI**

I have both learned so much and contributed to this valuable program!

**ROBIN
TANAMACHI**

I've used OTCC resources as a grad student, as a post doc, and as a faculty member. I've also pointed colleagues and friends to the website on an almost monthly basis. It has made a huge difference in my career! Thanks for supporting this invaluable resource!

LEIF TAPANILA

Cutting Edge was a valuable resource when I was making the shift from doctoral student to early career prof. I participated in the Geobiology session and found it a wonderful chance to think more deeply about 'why' to teach, not simply the 'how' and 'what'. Glad that NSF has supported and invested in this program!

**ELHAMY
TARABEES**

I am from Egypt, and I have learned a lot from NSF and the On the Cutting Edge project. Thanks to NSF for projects and activities which present a lot of support to science and scientists.

**RACHEL
TEASDALE**

The On the Cutting Edge program has been an incredibly valuable program to me from the time I first participated (2005) to now. The programs helped me in my teaching and research and also in establishing the community of scholars I've met, collaborated with, and become friends with. Thank you NSF for your vision in supporting On the Cutting Edge, it has made a tremendous impact.

**JEFFREY
TEMPLETON**

"On the Cutting Edge" provides a critical resource for faculty to find exemplary active learning strategies that can be readily incorporated into undergraduate geoscience courses. I am grateful to NSF for providing their long-time support of this important educational resource.

**SARAH
TESSENDORF**

I utilized techniques I learned in the On the Cutting Edge "Preparing for an Academic Career in Geosciences" workshop in University-level large-format lecture courses that I taught. It was great to be able to attend a workshop focused on training future professors and instructors in pedagogical methods, since we are rarely exposed to that in our typical scientific graduate school experience.

**BARBARA
TEWKSBURY**

I am deeply grateful to the NSF and the program officers who had faith that we could engage the geoscience community in building what has turned out to be a wide-reaching and deep resource for geoscience faculty. Working with my fellow PIs and with all of the wonderful people who have participated in Cutting Edge workshops and events has also had a tremendous (and positive!) impact on my own teaching. Thank you!!

ROB THOMAS

I have been a contributor to OCE from the start. My situation is unique. Twenty-five years ago, I left Vassar College and went to Western Montana College. The campus was about to close, but I saw opportunity. We used our adversity to our advantage and became the first public university in U.S. history to adopt immersion scheduling (the "Block Plan") to facilitate experiential learning. I now never step in a classroom for anything but an introductory class. The campus is stable, growing, and shows every metric of success in learning that the educational research community has been chasing for years. Far less so value to me, we consistently rank as one of the best undergraduate colleges in the nation. I was the first and only geologist to receive the Carnegie/CASE U.S. Professor award and was appointed a Montana Regents' Professor, their highest faculty honor. The latter had never happened before. These awards go to faculty for their contributions to non-educational research. Not once before (or since) have the Regents selected a faculty for improving education. I will say that involvement with OCE was important,

especially with Dave Mogk, a friend, colleague, and Montana neighbor. Thanks to OCE for being there. My thanks to NSF for investing in the improbable.

CARA THOMPSON

What a wonderful program. Thank you so much for the support.

CHRISTY TILL

Both the "Preparing for an Academic Career in the Geosciences" and "Early Career Faculty" workshops were instrumental in my success to-date. I can't thank "On the Cutting Edge" and NSF enough for providing and supporting these crucial professional development opportunities for junior scientists!

SARAH TINDALL

It was very helpful to talk to other early career faculty when I was starting out. Thank you for the opportunity!

SARAH TITUS

I've attended 4 or 5 of these workshops over the years. They are important for getting new ideas for teaching, meeting colleagues, and thinking carefully about being an educator. My colleagues in other departments are jealous that there is such an organized network for geoscience education.

PAUL TOMASCAK	Please continue to support undergraduate geoscience education!
MARTA TORRES	An excellent resource and a very well-run program. Thanks!
LISA TRANEL	Thank you!
AL TRUJILLO	To NSF: Thanks for funding such worthwhile educational projects in the Geosciences!
JAN TULLIS	Thank you NSF!!!! The Cutting Edge programs have truly been transformational for our under-appreciated science. Their workshops (in person and virtual) and their treasure trove of proven teaching resources freely available to everyone on the web have reached and encouraged and helped teachers and learners of all ages, locations, and career stages. I have personally benefitted in many ways. In addition, the program has greatly contributed to the development of a collegial and collaborative community across all of the geosciences, and has helped with critical issues such as attracting and retaining a more diverse workforce.
JAMES TYBURCZY	Thank you for supporting 'On the Cutting Edge.' I have used Cutting Edge modules in my

	Hydrogeology course and in my Oceanography course. This is good and useful stuff!
MANUEL URIBE	Thanks to NSF for all of the support.
NICCOLE VILLA CERVENY	Thank you for supporting quality pedagogy in STEM. SERC is a valuable resource for many 2-year colleges and a fabulous way to develop community among STEM colleagues.
ENRICA VIPARELLI	<i>Signature of thanks</i>
KEN VOGLESONGER	The Cutting Edge and all of its associated programs have been a tremendous resource. As someone that started as an Assistant Professor in 2008, the resources, workshops, and community has been invaluable to my development as a teacher. Thank you.
CARYL E. WAGGETT	I have participated in workshops, developed modules, tested modules, and adopted others' activities and modules. I am deeply grateful that NSF has chosen to value undergraduate science education, and demanded of it the same depth of rigor and peer review as other types of scientific inquiry. This program has allowed faculty who conduct innovative curricular development to receive similar recognition from our home

institutions for this important work. It is clear at this point in time that scientific literacy is more vital than ever.

BECCA WALKER

I would like to offer my most sincere gratitude for your generous support of On the Cutting Edge, which has been a pivotal part of my graduate education and subsequent professional development as a faculty member since the inception of the program. The program has been an invaluable resource for curricular materials and has provided an opportunity for ongoing collaboration with geoscience education faculty from around the country. As a participant in many workshops, including Preparing for An Academic Career in the Geosciences, Teaching Geosciences in the Field, Designing Effective and Innovative Courses in the Geosciences, and Teaching Oceanography, I can confidently say that the On the Cutting Edge workshop series has been by far the most beneficial training that I've had in my career in geoscience education. Many thanks for providing me with opportunities to improve my teaching and work with my colleagues in the geoscience education community as part of the On the Cutting Edge program. I look forward to being a part of future NSF-supported projects that offer similar opportunities for geoscience faculty.

EMILY WALSH

Thank you, NSF, for supporting the On the Cutting Edge program!! I started my teaching career not long after the On the Cutting Edge was started, and I have been using its resources for

every class that I teach. It is a phenomenal collection of activities, images, and knowledge all collected in one place--easily searchable, easily used! I have so many colleagues in other fields that are immensely jealous about this valuable, valuable resource! I know that using these materials (even just looking through them to choose which to use) has made me a better teacher – I am more aware of the different ways to teach and more apt to teach in a hands-on manner than merely lecture. I have to think that this has raised the bar on geology teaching around the country, and I think our students can only have benefited! Thank you for supporting the students and teachers of geoscience!!

**SUZANNE
WALTHER**

Thank you for valuing geoscience education by supporting it through the Cutting Edge project. I have personally benefited from several of the programs offered through the project and still feel supported by the program and people I met over the years. I began my involvement with On the Cutting Edge as a graduate student and am now faculty at a 4-year institution. Thank you!

AL WANAMAKER

This was the best professional development workshop I have ever attended. It was right on the money and gave me what I needed during a difficult time of my early career. I always recommend new faculty apply for the workshop. Besides making some new great friends, I have collaborated with several participants on papers and proposals. This was a life changing event. Thanks!

**JAMES
WASHBURNE**

Thanks for your continued and sustaining support to this effective program.

**CHERYL WATERS-
TORMEY**

I and my colleagues at Western Carolina University use the workshops' and website's suggestions and ideas monthly! Thank you for the sustained support.

**SHIMON
WDOWINSKI**

The Cutting Edge has provided excellent resources and guidance for improving my teaching and mentoring skills. I thank NSF for the important support of On the Cutting Edge.

LAURA WEBB

Thank you for supporting this very important program that serves the geoscience educational community. The professional development opportunities it has fostered are impactful, and the online resources are invaluable.

LORI WEEDEN

Thank you for your support!

KARL WEGMANN

Dear folks at NSF, Thank you for supporting the On The Cutting Edge program and geoscience education efforts in general. They are as important and beneficial to me now as they were when I was a PhD student and early career faculty member. I know that I am a better educator of the geosciences because of my direct

and indirect involvement with On The Cutting Edge.

ARLO WEIL

Dear NSF – I have participated in at least four different Cutting Edge workshops over my career, and every single one of them was helpful. Whether it was related to teaching in my particular discipline, in chairing a department, or developing a 21st century Earth Science curriculum, I always found the meetings extremely well run, well attended, and useful. Thank you for your support.

TARIN WEISS

The Cutting Edge materials have been invaluable to my teaching and learning in the geosciences. Thank you for your support of our incredibly important discipline and of our efforts to teach through meaningfully relevant curriculum!

**GARY
WEISSMANN**

Not only are these programs hugely valuable to help improve how we teach geoscience, but possibly more importantly these programs have helped change the geoscience community to be one that is more collaborative in many ways. That vision and outcome has immensely helped us move forward as a community of scholars. Thank you for supporting this innovative and effective approach.

JENNIFER WENNER

Thank you for supporting this wonderful program! I (and many others) would not be the teachers or scientists we are without this program.

SCOTT WERTS

I have had the good fortune to attend two Cutting Edge workshops. The skills I learned as a result of these workshops have completely transformed me as a professor and, subsequently as a person. Time management as an early professor is a difficult skill to master as we often don't realize how much time service obligations may take or how much time may be needed for lecture preparation because the way we think of the material "makes sense to us." When issues in the lab crop up or other priorities interrupt our plans, we need to adjust quickly. These workshops teach us how to plan, adapt, manage and not lose our collective minds in the early years. I have fundamentally changed the way I manage and assess in the classroom, I have been able to build a research program that has students seeking me every semester for opportunities, and I have made myself a respected colleague at my institution. Without hearing that early struggles are common and definitely coming, I don't know if I would have been nearly as successful. I want to thank you for advancing learning in the Earth Sciences, advancing research skills in these areas, and helping us train the next generation of scientists. The benefits to society are difficult to quantify, but know that the impact has been incredible.

SCOTT M. WHITE

Cutting Edge programs have helped several of us at institutions where mentoring is not part of the culture. Thanks to NSF for supporting resources for STEM faculty.

SCOTT WHITE

Thank you, NSF, for funding the On the Cutting Edge program. I benefited greatly from attendance and participation in the "Teaching Geoscience Using GIS and Remote Sensing" held in Bozeman, Montana, in August, 2010. Please continue to fund such worthwhile programs, especially for new college and university faculty.

HELEN WHITE

Thank you for funding this course that came at such a critical time in my career.

JILL WHITMAN

Thank you, NSF, for your long-term support of the On the Cutting Edge professional development program for geoscience faculty. It has made a tremendous difference in the development of faculty and the learning of our students!

**SHELLEY
WHITMEYER**

This site has provided great ideas and resources to make my class better!

**STEVE
WHITMEYER**

I particularly appreciated the discipline-themed workshops, which brought together the

geoscience community and encouraged collaboration between education professionals.

DONNA WHITNEY

Signature of thanks

**THOMAS
WHITTAKER**

The On The Cutting Edge Program was extremely beneficial to me in my professional development as a geoscience instructor at a two-year college. I have always recommended it to others as it is truly a wealth of riches for anyone getting started. An amazing program! Many thanks to NSF for supporting it!

**ALAN
WHITTINGTON**

Thank you for supporting innovative geoscience teaching, making the next generation of geoscientists better prepared.

KATRYN WIESE

Thank you for making possible such amazing networking and professional development opportunities for earth science educators. It has made a huge positive difference to my teaching, my students' learning, and professional development throughout my institution.

**WENDI J. W.
WILLIAMS**

The "On the Cutting Edge" professional development and professional geoscience education-researcher practitioner community has not only been a catalyst but a *sustaining force*

in my career as both a 2YC and 4YCU faculty. This investment by our Nation in the geosciences and integrated sciences through "On the Cutting Edge" has not only benefited my life trajectory, but I believe it has provided valuable support in the improved, authentic development of pre- and in-service preK – 12 teachers that I have had the privilege to facilitate, and collaborate with, during these most recent 15 years. The professional development support of our community helps me and multiple stakeholders better leverage the more robust implementation of Next Generation Science Standards in my state of Arkansas. Thank you, thank you for the investment in the important geosciences thread running throughout S-T-E-M!

LYNDA WILLIAMS

This is one of the best programs with the broadest impact possible. Thanks for supporting this important program.

**MICHAEL
WILLIAMS**

I have attended a number of Cutting Edge events, I have organized a few, and I have used web resources extensively. I think that this program has had a more significant effect on teaching than any other that I know of. This has been and still is an essential resource for Geoscience teachers/professors/instructors across the country. Thank you to NSF.

AMY WILLIAMS

This program was truly formative for me. Thank you for the support of this program!

**RALPH
WILLOUGHBY**

I retired as a working geologist in 2008 but taught a college course in paleontology four more sessions (across seven years). The 2009 course on Teaching Paleontology helped refresh my teaching by putting me with other active paleontologists. Thanks.

JOHN WILSON

Thank you for funding On The Cutting Edge. It has made a strong impact in all aspects of Geology.

ALICIA WILSON

I attended the Early Career development workshop in 2003. First the low bar: I had not known, before this workshop, that workshops and meetings could be engaging and useful. This alone was very useful information(!). But now the higher bar: I am not sure whether I would have stayed in my tenure-track position without this workshop. By this I mean that I literally asked one of the leaders whether I should quit or not. I was 2 1/2 years in as an assistant professor and getting essentially no mentoring at my home institution. 15 years later I am a successful full professor with well-funded research and satisfying teaching, and I can say that the advice got at the workshop was extremely useful. A few years ago an assistant professor came through as a seminar speaker with signs of poor mentoring (lots of questions) – I phoned her department chair and told him about the workshop. The website has also been valuable over the last 15 years, particularly in deciding how to design and teach courses. Only last week I found a new lab

on the site and adapted it for my intro class. So, thank you!

MERRY WILSON

Thanks for the ideas, support, and care you devoted to my development as a faculty member.

KARL WIRTH

A huge thanks to NSF. The Cutting Edge Programs played a vital role in shaping the direction of my teaching and research. In my experience, On The Cutting Edge was one of the most effective uses of federal funding to improve teaching and learning in the earth science community and beyond.

STEVEN WOJTAL

The significant impact of the program is apparent in the high level of competence, confidence, and collegiality of my junior colleagues. This program is most worthwhile.

FELISA WOLFE-SIMON

To whom it may concern, I am writing to voice my strong support and appreciation for "On the Cutting Edge," which has been incredibly helpful to my own career and that of my students for the past 15 years. Years ago, I participated in an early career workshop and I currently actively utilize the online materials. This is a wonderful database and network of scientists that is clearly important to the future of our scientific community. Thank you NSF for your initial and continued financial support.

MARTIN WONG

Many, many thanks for supporting this invaluable resource to the geoscience community!

**MICHAEL
WYSESSION**

Jill, Keith, others --- Thank you so much for the support for so many years to allow us to make OTCE into a program with broad and wide impacts in so many areas of the geosciences!!

PEG YACOBUCCI

Thanks to NSF for supporting On the Cutting Edge, which has truly transformed how undergraduate geoscience is taught!

QIANG YANG

I have learned a lot and expanded my network from attending a series of workshops. Thanks Or the Cutting Edge, thanks NSF.

**JOE C.
YLEDERMAN JR.**

A great program that helped me become a better teacher and the benefit to students – our future scientists – will be impactful for many years to come.

DUNCAN YOUNG

I attended the workshop in Wisconsin in 2007, and found it very useful. In particular, I wish I had paid more attention to the advice on life-work balance!

ROBIN ZHANG

I participated in a workshop as an early career faculty over 10 years ago. It provided me with the first opportunity to learn what it meant to be a faculty member in the United States. I also got to share the experience with participants from other regional public universities, where the resources are more constrained. It was valuable.

VITALY ZLOTNIK

Thank you for opportunity to develop national cooperation in teaching and research between colleagues in various disciplines in the Earth Sciences. And many thanks to dedicated leaders at Carleton College that bear the organizational brunt of this work.

LUCAS ZOET

On the Cutting Edge was a great experience and really helped me set goals for the next few years.

**SUZANNE ZURN-
BIRKHIMER**

I attended the Workshop for Early Career Geoscience Faculty several years ago. The workshop helped me in attaining tenure and gave me the skills to move into administration. Graduate school does not adequately prepare Ph.D.s to become outstanding faculty. Thank you, NSF, for providing funding for this amazing workshop and please continue to fund this important work!

Thank You, NSF

