

Postdoctoral Fellow
Science Education Resource Center
Carleton College
Northfield, MN 55057

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ACADEMIC BACKGROUND

May 2003	Australian National University	Canberra, ACT
<i>Doctorate of Philosophy in Biochemistry and Molecular Biology</i>		
December 1997	Arizona State University	Tempe, AZ
<i>Bachelor of Science, cum laude, in Biology</i>		

TEACHING EXPERIENCE AND RELATED ACTIVITIES

EXPERIENCE IN TEACHING AND EDUCATION:

Current Science Education Resource Center, Carleton College Northfield, MN
Postdoctoral Fellow

- Teaching with Data (<http://serc.carleton.edu/introgeo/teachingwdata/index.html>)
- Teacher Preparation (<http://serc.carleton.edu/teacherprep/index.html>)
- Development of data guides to support and facilitate teaching with data

Examples: <http://serc.carleton.edu/usingdata/datasheets/MoteMarineLab.html>
http://serc.carleton.edu/usingdata/datasheets/Vostok_IceCore.html

- Development of web-based collections on courses and programs to highlight and stimulate faculty involvement in preparing and supporting Earth Science K-12 teachers

Examples: http://serc.carleton.edu/teacherprep/courses/UDN_ScienceSemester.html
<http://serc.carleton.edu/teacherprep/programs/TimeToLearnUWE.html>

2004-2005 Carleton College Northfield, MN
Visiting Assistant Professor of Biology

- Biochemistry with Lab
- Introductory Biology with Lab
- Bioinformatics (Designed and taught course)
- Special topics in Cell Biology: Sensory Signal Transduction (Designed and taught course)
- Supervised eight undergraduate research students

Instructor

- Summer Teaching Institute for first time AP Biology teachers

2003-2004 University of New Brunswick Fredericton, NB
Supervisor

- Co-supervised NSERC summer research student (Project: The path to 'high-light' resistance in mutants of *Chlamydomonas reinhardtii*)

1999-2000

Arizona State University

Tempe, AZ

Supervisor

- Co-supervised REU summer student (Project: Defining the role of specific carotenoids in non-photochemical quenching of chlorophyll fluorescence)
- Co-supervised independent-study research student (Project: Light-independent chlorophyll biosynthesis in angiosperms: an evolutionary relic or biochemical anomaly?)

1998-1999

Teaching assistant

- General Biology (1999): Assistant coordinator for laboratory section of course
- General Biology (1998): Laboratory demonstrator

RELATED ACTIVITIES:

2003-2004

University of New Brunswick

Fredericton, NB

Diploma

- University Teaching: Nine month course in theory and practice of adult education

2003

Project 2061, AAAS

Washington, D.C.

Internship

- Interned with Project 2061, an initiative of the American Association for the Advancement of Science that advocates K-12 science education reform and promotes science literacy

TEACHING INTERESTS

Biology

Introductory Biology
Bioinformatics
Evolution
Microbiology
Plant Biology/Botany
Genetics
Molecular Biology
Cell Biology
Phycology

Chemistry

Introductory Chemistry
Biochemistry
Photochemistry

Biology for Non-majors
Plant & Human Interactions
Microbes & the Environment
Environmental Issues
Genomes & Evolution
Biology of Women

Upper Division/Seminar Courses

Sensory Signal Transduction
Environmental Chemistry
Computational Biochemistry
Bioenergetics *
Marine Microbiology
Molecular Genetics
Light: Science & Culture *

* could also be adapted for non-majors

ACADEMIC AWARDS

- Postdoctoral Fellowship; National Science Foundation (2005-2006)
- Postdoctoral Fellowship; Genome Canada, Protist EST Project (2002-2004)
- Endowment for Excellence Award, ANU PhD scholarship (1999-2002)
- American Society for Photobiology Travel Award (2000)
- Gordon Research Conference Travel Award (2000)
- National Science Foundation Graduate Research Training Grant (1998-1999)

- American Society of Plant Physiologists Travel Award (1999)
- NSF Research Experience for Undergraduates Award (Summer & Fall 1994; Summer 1995)

RESEARCH EXPERIENCE & INTERESTS

2004-2005 Carleton College Northfield, MN

Principal Investigator

Research Interests:

- Evolution of intracellular signal transduction pathways
- Compartmentalization and regulation of tetrapyrrole biosynthesis
- Evolution of spectral tuning in photosynthetic antennae
- Use of RNA interference techniques in protists

2002-2004 University of New Brunswick Fredericton, NB

Postdoctoral Fellow

- Project: Light stress-induced genes and the evolution of chloroplasts

Experience:

- Generated cDNA libraries from the green alga *Euglena gracilis* and the glaucophyte *Cyanophora paradoxa* and analyzed over 10,000 sequences to facilitate gene discovery
- Performed phylogenetic analyses to study the evolutionary relationships amongst photosynthetic eukaryotes and infer the origins of secondarily derived plastids
- Compared cDNA libraries from high light-stressed and non-stressed cultures and used a bioinformatics approach to probe for potential trends and novelties in the evolution of light harvesting and photoprotective strategies
- Isolated and characterized a novel light-harvesting complex from *Cyanophora paradoxa*

1998-2002 Australian National University Canberra, ACT

Arizona State University Tempe, AZ

PhD Research

- Project: Pigment biosynthesis and function in *Arabidopsis*

Experience:

- Generated transgenic plants with altered carotenoid content and defined the roles of specific carotenoids in light harvesting and photoprotection
- Characterized the roles of the magnesium chelatase enzyme complex in pigment biosynthesis and chloroplast-nuclear genome signalling through analyses of chlorophyll deficient mutants of *Arabidopsis*

1996-1997 Arizona State University Tempe, AZ

Honours Thesis

- Project: Chlorophyll biosynthesis in *Nicotiana tabacum* genetically engineered with sense or antisense glutamate semialdehyde aminotransferase

Summer 1994 & 1995 Arizona State University Tempe, AZ
Research Experience for Undergraduates, NSF

- Project: Kinetics and localization of thylakoid membrane biogenesis in *Chlamydomonas reinhardtii*

Fall 1994 Whitney Laboratory, University of Florida St. Augustine, FL
Research Experience for Undergraduates, NSF

- Project: Elucidating mechanisms that effect the interaction between light and the circadian clock on the retina in *Limulus*

COMMUNITY AND UNIVERSITY SERVICE

2003-2004 Aventis Biotech Challenge Fredericton, NB
Mentor

- Mentored high school student researcher (3rd place in New Brunswick)
- Project: Mining algal diversity for enhanced production of 'green-fuel'

2003-2004 Science East Science Centre Fredericton, NB
Volunteer

- Developed activities for Science Summer Camps and outreach programs
- Organized public lecture series held in collaboration between Science East and UNB
- Served as judge for K-12 regional science fair

1999-2001 Australian National University Canberra, ACT
Volunteer

- Volunteered as a laboratory demonstrator for the Mini Degree program offered to middle-school students by the Department of Biochemistry and Molecular Biology

PUBLICATIONS

H.M. Rissler & D.G. Durnford. 2005. Isolation of a novel carotenoid-rich protein in *Cyanophora paradoxa* that is immunologically related to the light-harvesting complexes of photosynthetic eukaryotes. *Plant and Cell Physiology* 46: 416-424.

B.J. Pogson, **H.M. Rissler**, & H.A. Frank. 2005. The Roles of carotenoids in photosystem II of higher plants. *In: Photosystem II: The Water/Plastoquinone Oxido-Reductase in Photosynthesis*. Kluwer Publications Advances in Photosynthesis and Respiration Series.

H. Rissler, E. Collakova, D. DellaPenna, J. Whelan, & B. Pogson. 2002. Expression of a second Chl I gene of the magnesium chelatase in Arabidopsis supports only limited chlorophyll synthesis. *Plant Physiology* 128: 770-779.

H.M. Rissler & B.J. Pogson. 2001. Antisense inhibition of the β -carotene hydroxylase enzyme in Arabidopsis and the implications for carotenoid accumulation, photoprotection and antenna assembly. *Photosynthesis Research* 67: 127-137.

B.J. Pogson & **H.M. Rissler**. 2000. Genetic manipulation of carotenoid biosynthesis and

photoprotection. *Philosophical Transactions of the Royal Society Biological Sciences* 355: 1395-1403.

B.G. Calman, A.W. Andrews, **H.M. Rissler**, S.C. Edwards, & B.A. Battelle. 1996. Calcium/calmodulin-dependent protein kinase II and arrestin phosphorylation in *Limulus* eyes. *Journal of Photochemistry and Photobiology B-Biology* 35: 33-44.

MANUSCRIPTS IN PREPARATION

E. Johnson, J.M. Postlethwaite, and **H.M. Rissler**. 2005. A structural reclassification of antennae proteins sheds light on the evolutionary history of photosynthesis.

L. Wagner, J. Osmundson, and J. Martin and **H.M. Rissler**. 2005. At the cross-roads of chloroplast evolution: Compartmentalization and regulation of tetrapyrrole biosynthesis following the acquisition of plastids by primary and secondary endosymbiosis.

PRESENTATIONS AND PUBLISHED ABSTRACTS

AS PRESENTER:

H.M. Rissler, S.P. Fox, & C.A. Manduca. 2006. Using data in the classroom: Engaging educators, students, and the public with data that address environmental issues. 15th Western Photosynthesis Conference. Pacific Grove, CA.

H.M. Rissler & D.G. Durnford. 2003. Photoacclimation in *Cyanophora paradoxa*: insights into the evolution of light harvesting and photoprotective strategies. Plant Canada. Antigonish, NS. *Poster presentation*.

H.M. Rissler, E. Collakova, J. Wheelan, & B.J. Pogson. 2001. Chlorophyll biosynthesis: characterization of the CHL I subunit of the magnesium chelatase in *Arabidopsis* reveals two gene products with different properties. 12th International Congress of Photosynthesis. Brisbane, Queensland. Australia. *Poster presentation*.

H.M. Rissler & B.J. Pogson. 2000. Carotenoid biosynthesis and photoprotection in *Arabidopsis*: manipulating the β -carotene (provitamin A) content of plants. 13th International Congress of Photobiology. San Francisco, CA. *Poster presentation*.

H.M. Rissler, E. Collakova, D. DellaPenna, & B.J. Pogson. 2000. Characterization of the magnesium chelatase in *Arabidopsis*. Gordon Research Conference on Biology and Chemistry of Tetrapyrroles. Newport, RI. *Poster presentation*.

H.M. Rissler, E. Collakova, D. DellaPenna, & B.J. Pogson. 1999. Magnesium chelatase: characterization of a chlorophyll biosynthetic enzyme in *Arabidopsis*. *Plant Biology* 99, American Society of Plant Biologists Annual Meeting. Baltimore, MD. *Poster presentation*.

H.M. Rissler, E. Collakova, D. DellaPenna & B.J. Pogson. 1998. The CHL I subunit of the magnesium chelatase is encoded by a multi-gene family in *Arabidopsis*. 7th Western Photosynthesis Conference. Pacific Grove, CA. *Poster presentation*.

AS CO-AUTHOR:

- E. Johnson, J. Postelthwaite, & **H. Rissler**. 2006. Structural reclassification of antaennae proteins sheds light on the evolutionary history of photosynthesis and photoprotection. 15th Western Photosynthesis Conference. Pacific Grove, CA. *Poster presentation*.
- L. Wagner & **H. Rissler**. 2006. At the crossroads of plastid evolution: tetrapyrroles and intracellular signal transduction. 15th Western Photosynthesis Conference. Pacific Grove, CA. *Poster presentation*.
- B.J. Pogson & **H.M. Rissler**. 2000. Genetic manipulation of carotenoid biosynthesis and photoprotection. The Royal Society of London Discussion Meeting. Photoprotection of the photosynthetic apparatus: alternative photon and electron sinks. London, England. *Oral presentation*.
- B.J. Pogson & **H.M. Rissler**. 2000. Carotenoid biosynthesis and photoprotection in *Arabidopsis*. 12th International Symposium on Carotenoids. Cairns, Queensland, Australia. *Oral presentation*.
- B.J. Pogson & **H.M. Rissler**. 1999. Carotenoid biosynthesis and photoprotection in *Arabidopsis*. 10th International Arabidopsis Conference. Melbourne, Victoria, Australia. *Poster presentation*.
- B.J. Pogson, E. Collakova, D. DellaPenna, & **H.M. Rissler**. 1999. A subunit of a chlorophyll biosynthetic enzyme, the magnesium chelatase, is encoded by a single gene in the large Barley genome and a multi-gene family in the small *Arabidopsis* genome. 10th International Arabidopsis Conference. Melbourne, Victoria, Australia. *Poster presentation*.

REFEREES

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