

CARL ROTHFELS

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EDUCATION/APPOINTMENTS

2015–present	University of California, Berkeley	<i>Assistant Professor and Faculty Curator</i>
2015	National Evolutionary Synthesis Center, Durham NC	<i>Visiting Scholar</i>
2013–2015	University of British Columbia, Vancouver BC <ul style="list-style-type: none">▪ Advisor: Dr. Sarah Otto	<i>Postdoctoral Fellow</i>
2006–2012	Duke University, Durham NC <ul style="list-style-type: none">▪ Advisor: Dr. Kathleen Pryer	<i>PhD Biology</i>
1996–2001	McMaster University, Hamilton ON	<i>Bachelor of Arts & Science Combined Honours Biology</i>

PUBLICATIONS

1. **Rothfels, C.J.**, F-W. Li, and K.M. Pryer. 2017. Next-generation polyploid phylogenetics: Rapid resolution of hybrid polyploid complexes using PacBio single-molecule sequencing. *New Phytologist*. 213(1): 413–429. doi:10.1111/nph.14111
2. PPG1 (Schuettpelez, E., H. Schneider, A.R. Smith, P. Hovenkamp, J. Prado, G. Rouhan, A. Salino, M. Sundue, T.E. Almeida, B. Parris, E.B. Sessa, A.R. Field, A.L. de Gasper, **C.J. Rothfels**, M.D. Windham, M. Lehnert, B. Dauphin, A. Ebihara, S. Lehtonen, P.B. Schwartzburd, J. Metzgar, L.-B. Zhang, L.-Y. Kuo, P.J. Brownsey, M. Kato, M.D. Arana, and 68 other contributors). 2016. A community-derived classification for extant lycophytes and ferns. *Journal of Systematics and Evolution*. 54(6): 563–603.
3. Hsu, P.Y., L. Calviello, H.-Y.L. Wu, F.-W. Li, **C.J. Rothfels**, U. Ohler, and P.N. Benfey. 2016. Super-resolution ribosome profiling reveals unannotated translation events in *Arabidopsis*. *PNAS*. 113(35).
4. Bourque, S., S. Jeandroz, V. Grandperret, N. Lehotai, S. Aimé, D.E. Soltis, N.W. Miles, M. Melkonian, M.K. Deyholos, J.H. Leebens-Mack, M.W. Chase, **C.J. Rothfels**, D.W. Stevenson, S.W. Graham, X. Wang, S. Wu, J.C. Pires, P.P. Edger, Y. Zhou, Y. Xie, E.J. Carpenter, G.K.-S. Wong, D. Wendehenne, and V. Nicolas-Francès. 2016. The evolution of HD2 proteins in green plants. *Trends in Plant Science*. 21(12): 1008–1016.
5. Jia, Q., G. Li, T.G. Köllner, J. Fu, X. Chen, W. Xiong, B.J. Crandall-Stotler, J.L. Bowman, D.J. Weston, Y. Zhang, L. Chen, Y. Xie, F.-W. Li, **C.J. Rothfels**, A. Larsson, S.W. Graham, D.W. Stevenson, G.K.-S. Wong, J. Gershenzon, and F. Chen. 2016. Microbial-type terpene synthase genes occur widely in nonseed land plants, but not in seed plants. *PNAS*. 113(43): 12328–12333
6. Li, F-W., L-Y. Kuo, K.M. Pryer, and **C.J. Rothfels**. 2016. Genes translocated into the plastid inverted repeat show decelerated substitution rates and elevated GC content. *Genome Biology and Evolution*. 8(8): 2452–2458
7. Grusz, A.L., **C.J. Rothfels**, and E. Schuettpelez. 2016. Transcriptome sequencing reveals genome-wide variation in molecular evolutionary rate among ferns. *BMC Genomics*. 17(1): 692.
8. Zhou, X.-M., **C.J. Rothfels**, L. Zhang, Z.-R. He, T. Le Péchon, H. He, N.T. Lu, R. Knapp, D. Lorence, X.-J. He, X.-F. Gao, and L.-B. Zhang. A large-scale phylogeny of the lycophyte genus *Selaginella* (Selaginellaceae: Lycopodiopsida) based on plastid and nuclear loci. *Cladistics*. 32: 360–389.
9. Stevenson, S.R., Y. Kamisugi, C.H. Trinh, J. Schmutz, J.W. Jenkins, J. Grimwood, W. Muchero, G.A. Tuskan, S.A. Rensing, D. Lang, R. Reski, M. Melkonian, **C.J. Rothfels**, F-W. Li, A. Larsson, G.K-S. Wong, T.A. Edwards, A.C. Cuming. 2016. Genetic analysis of *Physcomitrella patens* identifies ABSCISIC ACID NON-RESPONSIVE (ANR), a regulator of ABA responses unique to basal land plants and required for desiccation tolerance. *The Plant Cell*. tpc.00091.2016.
10. Lane, T.S., C.S. Rempe, J. Davitt, M.E. Staton, Y. Peng, D.E. Soltis, M. Melkonian, M. Deyholos, J.H. Leebens-Mack, M. Chase, **C.J. Rothfels**, D. Stevenson, S.W. Graham, J. Yu, T. Liu, J.C. Pires, P.P. Edger, Y. Zhang, Y. Xie, Y. Zhu, E. Carpenter, G.K.-S. Wong, C.N. Stewart. 2016. Diversity of ABC transporter genes across the plant kingdom and their potential utility in biotechnology. *BMC Biotechnology*. 16(1): 1472–6750.
11. Zhang, L., E. Schuettpelez, **C.J. Rothfels**, X.-M. Zhou, X.-F. Gao, and L.-B. Zhang. 2016. Circumscription and

- phylogeny of the fern family Tectariaceae based on plastid and nuclear markers, with the description of two new genera: *Draconopteris* and *Malaiifilix* (Tectariaceae). Taxon. 65(4): 723–738.
12. **Rothfels, C.J.**, and S.P. Otto. 2016. Polyploid speciation. In R. M. Kliman (Ed.), Encyclopedia of Evolutionary Biology (pp. 317–326). Oxford: Academic Press. <http://doi.org/10.1016/B978-0-12-800049-6.00073-1>
 13. Devos, N., P. Szövényi, D.J. Weston, **C.J. Rothfels**, M.G. Johnson, and A.J. Shaw. 2016. Analyses of transcriptome sequences reveal multiple ancient large-scale duplication events in the ancestor of Sphagnopsida (Bryophyta). New Phytologist. 211(1): 300–318.
 14. Li, F.-W., L.-Y. Kuo, Y.-H. Chang, T.-C. Hsu, H.-C. Hung, W.-L. Chiou, **C.J. Rothfels**, Y.-M. Huang. 2016. *Asplenium pifongiae* (Aspleniaceae: Polypodiales), a new species from Taiwan. Systematic Botany. 41(1): 24–31.
 15. Pryer, K.M., L. Huiet, F.-W. Li, **C.J. Rothfels**, E. Schuettpelz. 2016. Maidenhair ferns—*Adiantum*—are indeed monophyletic and sister to shoestring ferns—vittarioids (Pteridaceae). Systematic Botany. 41(1): 17–23.
 16. Wolf, P.G., E.B. Sessa, D.B. Marchant, F.-W. Li, **C.J. Rothfels**, E.M. Sigel, M.A. Gitzendanner, C.J. Visger, J.A. Banks, D.E. Soltis, P.S. Soltis, K.M. Pryer, J.P. Der. 2015. An exploration of fern genome space. Genome Biology and Evolution. 7(9): 2533–2544.
 17. Delaux, P.-M, G.V. Radhakrishnan, D. Jayaraman, J. Cheema, M. Malbreil, J.D. Volkening, H. Sekimoto, T. Nishiyama, M. Melkonian, L. Pokorny, **C.J. Rothfels**, H.W. Sederoff, D.W. Stevenson, B. Surek, Y. Zhang, M.R. Sussman, C. Dunand, R.J. Morris, C. Roux, G.K.-S. Wong, G.E.D. Oldroyd, J.-M. Ané. 2015. Algal ancestor of land plants was preadapted for symbiosis. PNAS. 12(43): 13390–13395.
 18. Li, F.-W., **C.J. Rothfels**, M. Melkonian, J.C. Villarreal, D.W. Stevenson, S.W. Graham, G.K.-S. Wong, S. Mathews, K.M. Pryer. 2015. The origin and evolution of phototropins. Frontiers in Plant Science. Featured article: www.facebook.com/Frontiersin/photos/a.98097453753.87051.95775573753/10153607140243754/?type=1&theater
 19. Li, F.-W., M. Melkonian, **C.J. Rothfels**, J.C. Villarreal, D.W. Stevenson, S.W. Graham, G.K.-S. Wong, K.M. Pryer, S. Mathews. 2015. Phytochrome diversity in green plants and the origin of canonical plant phytochromes. Nature Communications 6.
 20. **Rothfels, C.J.**, F.-W. Li, E.M. Sigel, L. Huiet, A. Larsson, D.O. Burge, M. Ruhsam, M. Deyholos, D.E. Soltis, C.N. Stewart, S.W. Shaw, L. Pokorny, T. Chen, C. dePamphilis, L. DeGironimo, T. Chen, X. Wei, X. Sun, P. Korall, D.W. Stevenson, S.W. Graham, G.K.-S. Wong, K.M. Pryer. 2015. The evolutionary history of ferns inferred from 25 single-copy nuclear genes. American Journal of Botany. 102(7): 1089–1107. Highlighted article: <http://www.amjbot.org/content/102/7/1009?etoc>
 21. Zhang, L., **C.J. Rothfels**, A. Ebihara, E. Schuettpelz, T.L. Péchon, P. Kamau, H. He, X.-M. Zhou, J. Prado, A. Field, G. Yatskievych, X.-F. Gao, L.-B. Zhang. 2014. A global plastid phylogeny of the brake fern genus *Pteris* (Pteridaceae) and related genera in the Pteridoideae. Cladistics. 31: 406–423.
 22. **Rothfels, C.J.**, A.K. Johnson*, P.H. Hovenkamp, D.L. Swofford, H.C. Roskam, C.R. Fraser-Jenkins, M.D. Windham, K.M. Pryer. 2015. Natural hybridization between genera that diverged from each other approximately 60 million years ago. American Naturalist 185(3): 433–442. *Undergraduate mentee. Press: http://www.eurekalert.org/pub_releases/2015-02/du-dsp021315.php.
 23. Bennett, T., S.F. Brockington, **C.J. Rothfels**, S. Graham, D. Stevenson, T. Kutchan, M. Rolf, P. Thomas, G.K.S. Wong, O. Leyser, B.J. Glover, and C.J. Harrison. 2014. Paralogous radiations of PIN proteins with multiple origins of non-canonical PIN structure. Molecular Biology and Evolution. 31(8): 2042–2060.
 24. Itay, M., S. Zhan, **C.J. Rothfels**, N. Arrigo, M. Barker, L. Rieseberg, S. Otto. 2014. Methods for studying polyploid diversification and the dead end hypothesis: A reply to Soltis et al. (2014). New Phytologist. doi: 10.1111/nph.13192
 25. Wickett, N.J., S. Mirarab, N. Nguyen, T. Warnow, E.J. Carpenter, N. Matasci, S. Ayyampalayam, M. Barker, G.J. Burleigh, M.A. Gitzendanner, B. Ruhfel, E. Wafula, J. Der, S.W. Graham, S. Mathews, M. Melkonian, D.E. Soltis, P.S. Soltis, **C.J. Rothfels**, L. Pokorny, J. Shaw, L. DeGironimo, D. Stevenson, B. Surek, J.C. Villarreal, B. Roure, H. Philippe, C.W. dePamphilis, T. Chen, M. Deyholos, J. Wang, Y. Zhang, Z. Tian, Z. Yan, X. Wu, X. Sun, G.K.-S. Wong, J. Leebens-Mack. 2014. A phylotranscriptomics analysis of the origin and early diversification of land plants. PNAS 111(45): E4859–E4868.
 26. Matasci, N., L.-H. Hung, Z. Yan, E.J. Carpenter, N.J. Wickett, S. Mirarab, N. Nguyen, T. Warnow, S. Ayyampalayam, M. Barker, J.G. Burleigh, M.A. Gitzendanner, E. Wafula, J.P. Der, C.W. dePamphilis, B. Roure, H. Philippe, B.R. Ruhfel, N.W. Miles, S.W. Graham, S. Mathews, B. Surek, M. Melkonian, D.E. Soltis, P.S. Soltis, **C.J. Rothfels**, L. Pokorny, A.J. Shaw, L. DeGironimo, D.W. Stevenson, J.C. Villarreal, T. Chen, T.M. Kutchan, M. Rolf, R.S. Baucom, M.K. Deyholos, R. Samudrala, Z. Tian, X. Wu, X. Sun, Y. Zhang, J.

- Wang, J. Leebens-Mack, G.K.-S. Wong. 2014. Data access for the 1,000 Plants (1KP) project. GigaScience 3:17.
27. **Rothfels, C.J.**, A.K. Johnson*, M.D. Windham, K.M. Pryer. 2014. Low-copy nuclear data confirm rampant allopolyploidy in the Cystopteridaceae (Polypodiales). Taxon 63(5): 1026–1036 *Undergraduate mentee.
 28. Floyd, S.K., J.G. Ryan, S.J. Conway, E. Brenner, K.P. Burris, J.N. Burris, T. Chen, P.P. Edger, S.W. Graham, J.H. Leebens-Mack, J.C. Pires, **C.J. Rothfels**, E.M. Sigel, D.W. Stevenson, C.N. Stewart Jr., G.K.-S. Wong, J.L. Bowman. 2014. Origin of a novel regulatory module by duplication and degeneration of an ancient plant transcription factor. Molecular Phylogenetics and Evolution. 81: 159–173.
 29. Sessa, E.B., J.A. Banks, M.S. Barker, J.P. Der, A.M. Duffy, S.W. Graham, M. Hasebe, J. Langdale, F.-W. Li, D.B. Marchant, K.M. Pryer, **C.J. Rothfels**, S.J. Roux, M.L. Salmi, E.M. Sigel, D.E. Soltis, P.S. Soltis, D.W. Stevenson, P.G. Wolf. 2014. Between two fern genomes. GigaScience 3(15). doi:10.1186/2047-217X-3-15
 30. Li, F.-W., J.C. Villarreal, S. Kelly, **C.J. Rothfels**, M. Melkonian, E. Frangedakis, M. Ruhsam, E.M. Sigel, J.P. Der, J. Pittermann, D.O. Burge, L. Pokorny, A. Larsson, T. Chen, S. Weststrand, P. Thomas, E. Carpenter, Y. Zhang, Z. Tian, L. Chen, Z. Yan, Y. Zhu, X. Sun, J. Wang, D. Stevenson, B. Crandall-Stotler, A.J. Shaw, M.K. Deyholos, D.E. Soltis, S. Graham, M.D. Windham, J.A. Langdale, G.K.-S. Wong, S. Mathews, K.M. Pryer. 2014. Horizontal transfer of an adaptive chimeric photoreceptor from bryophytes to ferns. PNAS 11(18): 6672–6677. doi: 10.1073/pnas.1319929111
 31. **Rothfels, C.J.**, and E. Schuettpelz. 2014. Accelerated rate of molecular evolution for vittarioid ferns is strong and not driven by selection. Systematic Biology 63(1): 31–54. doi:10.1093/sysbio/syt058.
 32. Sundue, M.A. and **C.J. Rothfels**. 2014. Stasis and convergence characterize morphological evolution in eupolypod II ferns. Annals of Botany 113(1): 35–54. doi:10.1093/aob/mct247.
 33. **Rothfels, C.J.**, A. Larsson, F.-W. Li, E.M. Sigel, L. Huiet, D.O. Burge, M. Ruhsam, S.W. Graham, D. Stevenson, G.K.-S. Wong, P. Korall, K.M. Pryer. 2013. Transcriptome-mining for single-copy nuclear markers in ferns. PLoS ONE 8(10): e76957. doi:10.1371/journal.pone.0076957.
 34. León, B., **C.J. Rothfels**, M. Arakaki, K.R. Young, K.M. Pryer. 2013. Revealing a cryptic fern distribution through DNA sequencing: *Pityrogramma trifoliata* in the western Andes of Peru. Amer Fern J 103(1): 40–48.
 35. **Rothfels, C.J.**, M.D. Windham, and K.M. Pryer. 2013. A plastid phylogeny of the cosmopolitan fern family Cystopteridaceae (Polypodiopsida). Systematic Botany 38(2): 295–306.
 36. **Rothfels, C.J.**, E. Gaya, L. Pokorny, Paul Rothfels, Peter Rothfels, and G.R. Feulner. 2012. Five new records for the Arabian Peninsula and other significant fern, lichen and bryophyte collections from the UAE and northern Oman. Tribulus 20: 4–20.
 37. **Rothfels, C.J.**, E.M. Sigel, and M.D. Windham. 2012. *Cheilanthes feei* T. Moore (Pteridaceae) and *Dryopteris erythrosora* (D.C. Eaton) Kunze (Dryopteridaceae) new for the flora of North Carolina. American Fern Journal 102(2): 184–186.
 38. **Rothfels, C.J.***, M.A. Sundue*, L.Y. Kuo, A. Larsson, M. Kato, E. Schuettpelz, and K.M. Pryer. 2012. A revised family-level classification for eupolypod II ferns (Polypodiidae: Polypodiales). Taxon 61(3): 515–533. *Equally contributing.
 39. **Rothfels, C.J.***, A. Larsson*, L.-Y. Kuo*, P. Korall, W.-L. Chiou, and K.M. Pryer. 2012. Overcoming deep roots, fast rates, and short internodes to resolve the ancient rapid radiation of eupolypod II ferns. Systematic Biology 61(3): 490–509. COVER ARTICLE. *Equally contributing.
 40. Johnson, A.K.* , **C.J. Rothfels**, M.D. Windham, and K.M. Pryer. 2012. Unique expression of a sporophytic character on the gametophytes of notholaenid ferns (Pteridaceae). American Journal of Botany 99: 1118–1124. *Undergraduate mentee.
 41. Li, F.-W., L.-Y. Kuo, **C.J. Rothfels**, A. Ebihara, W.-L. Chiou, M.D. Windham, and K.M. Pryer. 2011. *rbcL* and *matK* earn two thumbs up as the core DNA barcode for ferns. PLoS ONE 6: e26597.
 42. Mayrose, I, S.H. Zhan, **C.J. Rothfels**, K. Magnuson-Ford, L. Rieseberg, M.S. Barker, and S.P. Otto. 2011. Recently formed polyploid plants diversify at lower rates. Science 333: 1257.
 43. Galbraith, D.A., N.E. Iwanycki, B.V. McGoey, J. McGregor, J.S. Pringle, **C.J. Rothfels**, and T.W. Smith. 2011. The evolving role of botanical gardens and natural areas: A floristic case study from Royal Botanical Gardens, Canada. Plant Diversity and Resources 33(1): 123–131.
 44. Pryer, K.M., E. Schuettpelz, L. Huiet, A.L. Grusz, **C.J. Rothfels**, T. Avent, D. Schwartz, and M.D. Windham. 2010. DNA barcoding exposes a case of mistaken identity in the fern horticultural trade. Molecular Ecology Resources 10: 979–985.
 45. Windham, M.D., L. Huiet, E. Schuettpelz, A.L. Grusz, **C.J. Rothfels**, J.B. Beck, G. Yatskievych, K.M. Pryer. 2009. Using plastid DNA sequences to redraw generic boundaries in cheilanthoid ferns (Pteridaceae). American Fern Journal 99: 128–132.

46. **Rothfels, C.J.**, M.D. Windham, A.L. Grusz, G.J. Gastony, and K.M. Pryer. 2008. Toward a monophyletic *Notholaena* (Pteridaceae): Resolving patterns of evolutionary convergence in xeric-adapted ferns. *Taxon* 57(3): 712–724.
47. Jaramillo, A., M.T.J. Johnson, **C.J. Rothfels**, and R.A. Johnson. 2008. The native and exotic avifauna of Easter Island: Then and now. *Boletín Chileno de Ornitología* 14(1): 8–21.
48. **Rothfels, C.J.** 2004. Significant vascular plant records from the Hamilton area, Ontario. *Canadian Field-Naturalist*, 118(4): 612–615.
49. **Rothfels, C.J.**, L.L. Beaton, and S. Dudley. 2002. The effects of salt, manganese, and density on life history traits in *Hesperis matronalis* L. from oldfield and roadside populations. *Can. Journal of Botany* 80: 131–139.
50. Johnson, M.T. and **C.J. Rothfels**. 2001. The establishment and proliferation of the rare exotic plant, *Lythrum hyssopifolia*, (Hyssop-leaved Loosetrife), at a pond in Guelph, Ontario. *Can. Field-Naturalist* 115(2): 229–233.

PEER-REVIEWED TECHNICAL REPORTS

1. **Rothfels, C.J.** and T.W. Smith. In review. Update COSEWIC report on Green Dragon, *Arisaema dracontium*. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
2. Smith, T.W. and **C.J. Rothfels**. In review. Update COSEWIC report on Broad Beech Fern, *Phegopteris hexagonoptera*. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
3. Waldron, G., **C.J. Rothfels**, J. Bowles, and Environment Canada. 2011. Recovery strategy for the Skinner's Agalinis (*Agalinis skinneriana*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada. v + 16 pp.
4. Smith, T.W. and **C.J. Rothfels**. 2010. Recovery strategy for Few-flowered Club-rush (*Trichophorum planifolium*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. ii + 4 pp. + Appendix vi + 22 pp. + addenda.
5. **Rothfels, C.J.** and S.Y. Gibson. 2007. COSEWIC assessment and update status report on the round-leaved greenbrier (Great Lakes Plains and Atlantic population) *Smilax rotundifolia* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
6. Smith, T.W. and **C.J. Rothfels**. 2007. Recovery strategy for Few-flowered Club-rush/Bashful Bulrush (*Trichophorum planifolium* (Sprengel) Palla) in Canada. Prepared for the Ontario Ministry of Natural Resources by Royal Botanical Gardens. Hamilton. vi + 22 pp.
7. Smith, T.W., **C.J. Rothfels**, and E. Oberndorfer. 2006. COSEWIC assessment and update status report on the American Columbo *Frasera caroliniensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 21 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

SELECT AWARDS

- 2012 **NSERC Postdoctoral Fellowship.** \$40,000/year for two years.
- 2011 **NSF Doctoral Dissertation Improvement Grant.** \$15000.
- 2009 **Lewis and Clark Fund for Exploration and Field Research.** American Philosophical Soc., \$2500.
- 2009 **Dissertation Research Grant.** Duke Center for Latin American and Caribbean Studies. \$900.
- 2009 **Graduate Student Research Grant.** American Society of Plant Taxonomists. \$600.
- 2008 **NSERC PGS D Research Scholarship.** NSERC, doctoral. \$21000/year for up to three years.
- 2007 **Graduate Student Research Award.** Society of Systematic Biologists. \$1700.
- 2007 **Mini-PEET Award.** Society of Systematic Biologists, to enhance the transfer of taxonomic expertise. \$1400.
- 2006 **Julie Payette-NSERC Research Scholarship.** \$25000 for one year.
- 2006 **University Scholars Fellowship.** Duke University's most prestigious award offered for graduate study.
- 2006 **James B. Duke Fellowship.** Duke University. \$4000 per year for four years.

TEACHING EXPERIENCE

- 2011 **North Carolina Botanical Garden** Instructor
- Designed and taught a four-week, 12-hour course on the *Biology and Evolution of Ferns and Lycophytes* for the Garden's Native Plant Studies Program.

- 2011 **Strategies and Techniques for Analyzing Microbial Population Structures** *Teaching Assistant*
- The 1st STAMPS workshop at Woods Hole, Mass. (10 days).
- 2011 **Workshop on Molecular Evolution** *Teaching Assistant*
- The 24th MoE workshop at Woods Hole, Mass. (10 days).
- 2008–2012 **Duke University Biology Department** *Teaching Assistant*
- Bio 142L: Plant Systematics and Evolution.
 - Bio 101L: An Introduction to Biology Through the Lens of Molecular Biology
 - Bio 102L: Genetics and Evolution
 - Bio 107: Major Moments in Organismal Evolution
- 2000–2001 **McMaster University, Hamilton ON** *Teaching Assistant*
- Assisted with lectures and other class activities for a third-year Environmental Inquiry course.

EMPLOYMENT EXPERIENCE

- 2003–2006 **Royal Botanical Gardens, Hamilton ON** *Natural Lands Steward (Acting)*
- Responsible for the implementation and administration of projects relating to RBG's 1000-hectare nature sanctuary properties, with an annual budget of approximately half a million dollars.
- 2002–2006 **Royal Botanical Gardens, Hamilton ON** *Field Botanist and Herbarium Curator*
- Responsible for wild-plant botany projects within and beyond RBG's boundaries.
 - Responsible for the curation of the 80,000-specimen RBG Herbarium (HAM).
- 2002 **University of Toronto, Toronto ON** *Field Researcher*
- Tracked Pine Marten (*Martes americana*) and other mammals for L. Nagel's PhD project: "Effects of selective logging on mammalian communities."
- 2002 **Ontario Ministry of Natural Resources** *Historic Vegetation Reporter*
- Produced a 37-page synthesis and summary of the historic fire regimes in Ontario Ecodistricts 5E-9 and 5E-10.
- Summers 1995–2000 **Ontario Ministry of Natural Resources** *Algonquin Provincial Park Interpretive Naturalist*
- Created and delivered natural history programs (guided walks, canoe outings, slide presentations, children's presentations, etc.) at Ontario's flagship provincial park.
 - Responsibilities also included Algonquin Park Museum Herbarium (APM) curatorial duties, and *Carex* surveys for an upcoming field guide.

PROFESSIONAL ACTIVITIES

- 2010–present **American Fern Journal** *Associate Editor*
- Manage and review manuscripts.
- 2009–present **Misc. Journals** *Reviewer*
- For *American Fern Journal*, *American Journal of Botany*, *Annales Botanici Fennici*, *Annals of Botany*, *AoB PLANTS*, *Australian Systematic Botany*, *Biodiversity and Conservation*, *BMC Evolutionary Biology*, *BMC Genomics*, *Botanical Studies*, *Brittonia*, *Cladistics*, *Genome*, *Genome Biology and Evolution*, *Grana*, *International Journal of Plant Sciences*, *Molecular Biology and Evolution*, *Molecular Ecology Resources*, *Molecular Phylogenetics and Evolution*, *New Phytologist*, *PeerJ*, *Phytokeys*, *Phytotaxa*, *Plant Systematics and Evolution*, *PLoS ONE*, *Scientific Reports*, *Systematic Botany*, *Systematic Biology*, and *Taxon*.
- 2010–present **Misc. Societies** *Member*
- I am a member of the following professional societies: American Fern Society, American Society of Naturalists, American Society of Plant Taxonomists, International Association for Plant Taxonomy, Society for the Study of Evolution, and the Society of Systematic Biologists.

- 2007–2010 **Duke University Biology Department** *Seminar Coordinator*
- Coordinator of the weekly Systematics Discussion Group and Seminar.

COMMUNITY EXPERIENCE

- 2002–2006 **Hamilton Naturalists' Club** *www.hamiltonnature.org* *Wood Duck Editor*
- Responsibilities included soliciting material, editing, and layout (nine issues annually).
- 2002–2006 **Hamilton Naturalists' Club** *www.hamiltonnature.org* *Member of Board of Directors*
- The HNC is a very active club, with annual project budgets in excess of \$250,000.
- 2002–2006; 1996–2000 **Hamilton Junior Naturalists' Club** *Coordinator*
- The HJNC meets monthly; there is currently a waiting list of over 100.
- 2003–2006 **Environmentally Significant Areas Impact Evaluation Group (ESAIEG)**
- ESAIEG advises Hamilton City Council on the impacts of proposed developments.
- 2004–2006 **Hamilton Odonate Count** *Coordinator and Compiler*
- Founded this annual census of the dragonflies and damselflies of the Hamilton area, attracted participants, and compiled and published the results.
- 2000–2005 **Ontario Breeding Bird Atlas** *Atlasser*
- Documented breeding statuses for Ontario avifauna according to a set protocol, including point counts.

CONFERENCE, SEMINAR, AND POSTER PRESENTATIONS

- Zhang, L.-B., L. Zhang, E. Schuettpelz, **C.J. Rothfels**, X. Zhou, and X.-F. Gao. 2016. Circumscription and phylogeny of the fern family Tectariaceae based on plastid and nuclear markers, with the description of two new genera: *Draconopteris* and *Malaiifilix* (Tectariaceae). Botany 2016: Savannah GA.
- Pryer, K.P., M.D. Windham, and **C.J. Rothfels**. 2016. A small new genus that unites surprisingly disparate cheilanthoid ferns (Pteridaceae). Botany 2016: Savannah GA.
- **Rothfels, C.J.**, K.P. Pryer, and F.-W. Li. 2016. Next-generation polyploid phylogenetics: Low-cost, high-throughput resolution of hybrid polyploid complexes using PacBio and PURC. Botany 2016: Savannah, GA.
- Graham, S.W., **C.J. Rothfels**, Q. Lin, and S. Zhan. 2016. *Equisetum* and its place in vascular-plant phylogeny. Symposium presentation, Botany 2016: Savannah GA.
- **Rothfels, C.J.** 2016. Deep thoughts: Musings on speciation and the fern hybrid *xCystocarpium roskamianum*. Plant Speciation 2016: Austin TX.
- Li, F.-W., L.-Y. Kuo, M. Simenc, S. Cheng, G.K.-S. Wong, M.D. Windham, J.P. Der, Y.-M. Huang, **C.J. Rothfels**, K.M. Pryer. 2016. *Salvinia*—a plant without roots—has the smallest known fern genome, and its “root-like” submerged leaves have recruited functional root genes. Poster: Plant & Animal Genome XXIV: San Diego, California.
- **Rothfels, C.J.**, F.-W. Li, E.M. Sigel, L. Huiet, A. Larsson, S.W. Graham, G.K.-S. Wong, K.M. Pryer. 2015. *Curated phylogenomics and the first single-copy nuclear phylogeny of the ferns*. Botany 2015: Edmonton.
- **Rothfels, C.J.**, K.M. Pryer, F.-W. Li. 2015. *Utilizing the PacBio next-generation sequencing platform to unravel hybrid polyploid complexes*. Next Generation Pteridology: Washington, DC.
- Wolf, P.G., E.B. Sessa, D.B. Marchant, F.-W. Li, **C.J. Rothfels**, E.M. Sigel, M.A. Gitzendanner, C.J. Visger, J.A. Banks, D.E. Soltis, P.S. Soltis, K.M. Pryer, J.P. Der. 2015. *Skimming the surface of fern nuclear genomes*. Next Generation Pteridology: Washington, DC.
- Zhan, S.H., **C.J. Rothfels**, A. Larsson, S. Westrand, D.O. Burge, M. Ruhsam, F.-W. Li, E.M. Sigel, S. Ellis, S. Shaw, A. Calcedo, T. Chen, L. DiGironomo, E. Sessa, J.P. Der, M. Barker, J. Leebens-Mack, M. Deyholos, G.K.-S. Wong, D. Stevenson, S.W. Graham. 2015. *Phylotranscriptomics of the seed-free vascular plants*. Next Generation Pteridology: Washington, DC.
- F.-W. Li, S. Cheng, J.P. Der, B. Song, X. Liu, X. Xu, A. Bräutigam, **C.J. Rothfels**, E.M. Sigel, P.G. Wolf, Y. Kato, H. Schlupmann, G.K.-S. Wong, K.M. Pryer. 2015. *The Azolla genome and the metagenomes of its obligate endosymbionts: unlocking the massive green potential of a little fern*. Next Generation Pteridology: Washington, DC.

- Der, J.P., E. Sessa, B. Marchant, F.-W. Li, **C.J. Rothfels**, E.M. Sigel, J.A. Banks, M.A. Gitzendanner, C.J. Visger, D.E. Soltis, P.S. Soltis, K.M. Pryer, P.G. Wolf. 2015. *Comparative exploration of fern genome space*. Poster: Plant & Animal Genome XXIII: San Diego, California.
- Li, F.-W., S. Cheng, J. Der, B. Song, X. Xu, X. Liu, A. Bräutigam, **C.J. Rothfels**, E.M. Sigel, P.G. Wolf, Y. Kato, H. Schluepmann, G.K.-S. Wong, K.M. Pryer. 2015. *The Azolla genome and the metagenomes of its obligate endosymbionts: Unlocking the massive green potential of a little fern*. Poster: Plant & Animal Genome XXIII: San Diego, California.
- Zhan, S.H., **C.J. Rothfels**, Z. Xi, F.-W. Li, E. Sessa, M.S. Barker, J.P. Der, M. Ruhsam, A. Larsson, D.O. Burge, L. DeGironimo, S. Ellis, C.C. Davis, P.G. Wolf, J. Leebens-Mack, M. Deyholos, G.K.-S. Wong, D.W. Stevenson. 2015. *Phylotranscriptomics of ferns and lycophytes, two key lineages in land-plant evolution*. Poster: Plant & Animal Genome XXIII: San Diego, California.
- **Rothfels, C.J.**, A.K. Johnson, P.H. Hovenkamp, D.L. Swofford, H.C. Roskam, C.R. Fraser-Jenkins, M.D. Windham, K.M. Pryer, 2014. *Natural hybridization between lineages that diverged from each other over 50 million years ago*. Oral Paper: Evolution 2014: Raleigh, North Carolina.
- Zhang, L., **C.J. Rothfels**, A. Ebihara, E. Schuettpelz, T. Le Péchon, P. Kamau, H. He, X. Zhou, J. Prado, A. Field, G. Yatskievych, X-F. Gao, L. Zhang. 2014. *A global plastid phylogeny of the brake fern genus Pteris (Pteridaceae) and related genera in the Pteridoideae*. Oral Paper: Botany 2014: Boise, Idaho.
- Wolf, P.G., J. Der, F-W. Li, **C.J. Rothfels**, M.A. Gitzendanner, C.J. Visger, D.E. Soltis, P.S. Soltis. 2014. *An exploration of fern genome space*. Oral Paper: Botany 2014: Boise, Idaho.
- **Rothfels, C.J.**, E. Schuettpelz. 2013. *Selection at the protein level does not drive the elevated substitution rates of vittarioid ferns*. Oral Paper: Evolution 2013, Snowbird, Utah.
- Li, F-W, **C. Rothfels**, A. Larsson, E. Sigel, L. Huiet, P. Korall, M. Ruhsam, D. Stevenson, S. Graham, G.K.S. Wong, K. Pryer. 2013. *Mining fern transcriptome data for low-copy nuclear markers*. Oral Paper: Botany 2013, New Orleans, Louisiana.
- **Rothfels, C.J.** 2012. *Polyploids are evolutionary failures*. Seminar: Systematics Discussion Group, Duke U.
- **Rothfels, C.J.**, A. Larsson, L-Y. Kuo, P. Korall, W-L. Chiou, K.M. Pryer. 2011. *Ancient, rapid, yet resolvable: The backbone phylogeny of the eupolypod II radiation*. Oral Paper: Botany 2011, St. Louis.
- Johnson, A.K., **C.J. Rothfels**, A.L. Grusz, E. Sigel, M.D. Windham, K.M. Pryer. 2011. *Sporophytes and gametophytes of notholaenid ferns (Pteridaceae) show correlated presence/absence of farina*. Poster: Botany 2011, St. Louis.
- Li, F-W., L-Y Kuo, **C.J. Rothfels**, A. Ebihara, W-L. Chiou, M.D. Windham, K.M. Pryer. 2011. *rbcL and matK earn a thumbs up as the core DNA barcode for ferns*. Oral Paper: Botany 2011, St. Louis.
- **Rothfels, C.J.** 2010. *Fast ferns: An accelerated rate of molecular evolution spans all three genomes in vittarioid ferns*. Seminar: Systematics Discussion Group, Duke University.
- **Rothfels, C.J.** 2010. *Ferns get some spine: Resolving the backbone of the eupolypods II phylogeny*. Seminar: Systematics Discussion Group, Duke University.
- **Rothfels, C.J.**, E. Schuettpelz, K.M. Pryer. 2010. *An accelerated rate of molecular evolution spans all three genomes in vittarioid ferns*. Oral Paper: Evolution 2010, Portland, Oregon.
- **Rothfels, C.J.**, M.D. Windham, K.M. Pryer. 2009. *New insights into the relationships of Cystopteris, Acystopteris, and Gymnocarpium*. Oral Paper: Botany 2009, Snowbird, Utah.
- **Rothfels, C.J.** 2008. *Diversification and Polyploidy in a Cosmopolitan Fern Genus*. Seminar: Systematics Discussion Group, Duke University.
- Windham, M.D., J. Beck, A.L. Grusz, L. Huiet, **C.J. Rothfels**, E. Schuettpelz, G. Yatskievych, and K.M. Pryer. 2008. *Using plastid and nuclear DNA sequences to redraw generic boundaries and demystify species complexes in cheilanthoid ferns*. Oral Paper: Botany 2008, Vancouver.
- **Rothfels, C.J.**, M.D. Windham, K.M. Pryer, Jordan Metzgar, and Amanda Grusz. 2007. *Making Fronds in the Desert: Phylogenetics of Farinose Ferns (Notholaena: Pteridaceae)*. Oral Paper: Botany 2007, Chicago.
- **Rothfels, C.J.** 2005. *Odonata of Vernal Pools*. Oral Paper: Ontario Vernal Pool Association AGM, ON.
- **Rothfels, C.J.** 2004. *Research at Royal Botanical Gardens*. Seminar: McMaster University Evolution and Ecology Seminar, Hamilton ON.
- **Rothfels, C.J.**, and M.T. Johnson. 2003. *Botanists abroad*. Keynote Address: Field Botanists of Ontario AGM.

POPULAR AND OTHER PUBLICATIONS

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- **Rothfels, Carl J.** and Alan R. Smith 2017. Athyriaceae, Revision 4, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=79419, accessed on January 14, 2017.
- **Rothfels, Carl J.** and Alan R. Smith 2017. Cystopteridaceae, Revision 4, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=101729, accessed on January 14, 2017.
- **Rothfels, Carl J.** and Alan R. Smith 2017. *Cystopteris*, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=10766, accessed on January 14, 2017.
- **Rothfels, Carl J.**, and Alan R. Smith. 2017. Woodsiaceae, Revision 4, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=93775, accessed on January 14, 2017.
- Pryer, Kathleen M., Alan R. Smith, and **Carl Rothfels**. 2009. Polypodiopsida Cronquist, Takht. & Zimmerm. 1966. Ferns. Version 14. <http://tolweb.org/Polypodiopsida/20615/2009.01> in The Tree of Life Web Project.
- **Rothfels, Carl**. 2008. Notholaenids. Cloakferns and allies. Version 23. <http://tolweb.org/notholaenids/133570/2008.12.23> [And approximately 30 nested pages] in The Tree of Life Web Project.
- **Rothfels, Carl**. 2008. Pteridaceae E.D.M. Kirchn. 1831. Brake Ferns, Maidenhair Ferns, and allies. Version 23. <http://tolweb.org/Pteridaceae/29352/2008.12.23> in The Tree of Life Web Project.
- Pryer, Kathleen M., Alan R. Smith, and **Carl Rothfels**. 2008. Polypodiidae Cronquist, Takht. & Zimmerm. 1966. Leptosporangiate Ferns. Version 23. <http://tolweb.org/Polypodiidae/21666/2008.12.23> in The Tree of Life Web Project.
- **Rothfels, C.** 2007. The Comet Darner (*Anax longipes*: Aeshnidae): Possibly breeding in Canada. Ontario Odonata 7:38-41.
- **Rothfels, Carl**. 2007. Three years of the Hamilton odonate count. Ontario Odonata 7: 36-37.
- **Rothfels, Carl**. 2007. Odonata of Halton Region. Ontario Odonata 7: 33-35.
- **Rothfels, C.** 2007. Dense darner swarm in Algonquin Provincial Park: Observations and questions. Ontario Odonata 7:43-48.
- **Rothfels, C.J.** 2007. Significant Hamilton Study Area plant records from the herbarium of Royal Botanical Gardens (HAM): 2005 (part 3). Wood Duck 60(5): 106-111.
- **Rothfels, C.J.** 2006. The dragonflies and damselflies (Odonata) of Halton Region, Ontario. Pages 135-158 in: Halton Natural Areas Inventory 2006: Volume 2 Species Checklists. Hamilton Naturalists' Club, Halton-North Peel Naturalists' Club, and South Peel Naturalists' Club. Hamilton, Ontario.
- **Rothfels, C.J.** 2006. Significant Hamilton Study Area plant records from the herbarium of Royal Botanical Gardens (HAM): 2005 (part 2). Wood Duck 60(4): 83-84.
- **Rothfels, C.J.** 2006. Significant Hamilton Study Area plant records from the herbarium of Royal Botanical Gardens (HAM): 2005 (part 1). Wood Duck 60(3): 60-62.
- **Rothfels, C.J.** 2006. Hamilton odonate count III: Zebras and spatterdocks. Wood Duck 60(1): 13-15.
- **Rothfels, C.J.** 2006. Significant Hamilton Study Area (HSA) odonate records from 2005. Wood Duck 59(9): 222-225.
- Van Ryswyk, B. and **C. Rothfels**. 2006. Significant 2005 odonate records from Halton Region. Wood Duck 59(8): 183-186.
- **Rothfels, C.J.** and W. Muma. 2006. Goldfinch killed by burdock. Wood Duck 59(7):151-152.
- **Rothfels, C.J.** 2006. One specimen, many stories. Now @ The Gardens. 3(1): 4-5.
- **Rothfels, C.J.** 2006. Heating up the sanctuaries: Gardens' prescribed burns 2006. Now @ The Gardens. 3(2): 7.
- **Rothfels, C.J.** 2005. Significant plant records from the herbarium of Royal Botanical Gardens (HAM): 2003. Field Botanists of Ontario Newsletter. 17(2): 7-12.
- **Rothfels, C.J.** 2005. Botanical diversions: The Latin name game. Field Bot. of Ontario Newsletter. 17(4): 12.
- **Rothfels, C.J.** 2005. A Brown Widow (*Lactrodectus geometricus*) arrives in Burlington. Wood Duck. 59(4): 98.
- **Rothfels, C.J.** 2005. The second annual Hamilton odonate count. Wood Duck. 59(3): 53-55.
- **Rothfels, C.** 2005. American Columbo (*Frasera caroliniensis*) in the Cartwright Nature Sanctuary. Wood Duck. 59(1): 3-4.
- **Rothfels, C.J.** 2005. Significant 2004 Hamilton Study Area plant records from the Royal Botanical Gardens herbarium (HAM). Part II: Alphabetical families Lardizabalaceae to Vitaceae. Wood Duck. 58(9): 219-223.

- **Rothfels, C.J.** 2005. Significant 2004 Hamilton Study Area plant records from the Royal Botanical Gardens herbarium (HAM). Part I: Alphabetical families Aceraceae to Lamiaceae. Wood Duck. 58(8): 187-192.
- Welch, T. and **C.J. Rothfels**. 2005. Trumpeter swans (*Cygnus buccinator*) fledge young at The Gardens. Now @ The Gardens. 2(4).
- Scott, E. and **C. Rothfels**. 2005. Getting muddy for the marsh—marsh volunteer plantings 2005. Now @ The Gardens. 2(4).
- Rivet, R. and **C.J. Rothfels**. 2005. York Boulevard Prairie prescribed burn 2005. Now @ The Gardens. 2(3).
- **Rothfels, C.J.**, T.Theysmeyer, and B.McKean. 2005. Rare fish found at the Fishway. Now @ The Gardens.
- **Rothfels, C.J.** 2005. Princess Point Earth Day planting. Now @ The Gardens. 2(2).
- **Rothfels, C.J.** and P.M. Catling. 2005. Major dragonfly migration at Hamilton. Ontario Odonata. 6: 40.
- **Rothfels, C.J.** 2004. Unicorn Clubtail (*Arigomphus villosipes*: Gomphidae): New records and summary of status in Ontario. Ontario Odonata. 5: 5-11.
- **Rothfels, C.J.** 2004. Significant plant records from the herbarium of Royal Botanical Gardens (HAM): 2002. Field Botanists of Ontario Newsletter. 16(3): 7-12.
- **Rothfels, C.J.** 2004. The First Annual Hamilton Odonate Count. Wood Duck. 58(2): 27-29.
- **Rothfels, C.J.**, S. Spisani and J. Sylvester. 2004. Significant 2003 Hamilton Study Area plant records from the Royal Botanical Gardens herbarium (HAM). Wood Duck. 57(9): 213-219.
- **Rothfels, C.J.** 2004. Stoneflies' Great-great-great-great Grandparents. Wood Duck. 57(8): 179.
- **Rothfels, C.J.** 2004. Intrepid insects: Capniids in Cootes. Wood Duck. 57(7): 153-154.
- **Rothfels, C.J.** 2004. The beetle, the oak, the fire, and the future of our nature sanctuaries. Now @ The Gardens.
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- **Rothfels, C.J.** 2002. Review: Lichen guides. Wood Duck. 56: 68.
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- **Rothfels, C.J.** 2002. Synthesis and Summary of the Historic Fire Regime of Ecodistricts 5E-9 and 5E-10. Ontario Ministry of Natural Resources, Ontario Parks. Unpublished report. 37pp.
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- **Rothfels, C.J.** and M.T. Johnson. 2000. Botany Excursions: Massassauga Point and Point Petre Wildlife Area, Prince Edward County. Field Botanists of Ontario Newsletter. 13(3): 6-10.
- **Rothfels, C.J.** 1998. Birds of the Feather Band Together. Wood Duck. 51(7): 131-136.