

## **Kenneth G. Karol**

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Molecular Systematics Studies  
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### **Education**

Ph.D., Plant Biology. 2004. University of Maryland, College Park, MD  
Bachelor of Science, Botany. 1992. University of Wisconsin, Madison, WI

### **Professional Experience**

*Associate Curator*. 2014-Present. Cullman Program, The New York Botanical Garden, Bronx, NY  
*Graduate Faculty*. 2020-Present. Grand Valley State University, Allendale, MI  
*Adjunct Associate Professor*. 2008-Present. Biological Sciences, Fordham University, Bronx, NY  
*Guest Faculty*. 2008-Present. Biology, Sarah Lawrence College, Bronxville, NY  
*Doctoral Faculty*. 2007-Present. City University of New York, Plant Sciences Ph.D. Subprogram, Lehman College, Bronx, NY  
*Assistant Curator*. 2007-2014. Cullman Program, The New York Botanical Garden, Bronx, NY  
*Chair - Phycological Section, Botanical Society of America*. 2006-2009.  
*Postdoctoral Fellow*. 2006-2007. National Institutes of Health - National Research Service Award, Genomics/Biology, University of Washington, Seattle, WA  
*LBNA Guest Researcher*. 2005-2008. Department of Energy Joint Genome Institute, Walnut Creek, CA  
*Research Associate (post-doc)*. 2004-2006. US National Science Foundation Tree of Life Program, Biology, University of Washington, Seattle, WA  
*Graduate Student*. 1998-2004. Cell Biology and Molecular Genetics, University of Maryland, College Park, MD  
*Research Assistant*. 1999-2003. US National Science Foundation PEET Program, University of Maryland, College Park, MD  
*Graduate Admissions Committee*. 2001 & 2002. Cell Biology and Molecular Genetics, University of Maryland, College Park, MD  
*Executive Committee*. 1999-2000. Green Plant Phylogeny Research Coordination Group  
*Biological Research Technician*. 1997-1998. Laboratory of Molecular Systematics, National Museum of Natural History, Smithsonian Institution, Washington, DC  
*Contract Researcher*. 1997. Laboratory of Molecular Systematics, National Museum of Natural History, Smithsonian Institution, Smithsonian Institution, Washington, DC  
*Research Technician*. 1993-1996. Biological Sciences, DePaul University, Chicago, IL  
*Visiting Scientist*. 1995. Paleobotany, Université des Sciences et Techniques du Languedoc, Montpellier, France  
*Research Technician III*. 1993. Zoology, University of Wisconsin-Madison, Madison, WI  
*Research Technician II*. 1991-1993. Botany, University of Wisconsin-Madison, Madison, WI

### **Teaching Experience**

*Guest Faculty*. 2019. DNA Barcoding: Investigation into Genomes of Characeae Chloroplasts, Biology 6725I1. Sarah Lawrence College, Bronxville, NY  
*Guest Faculty*. 2019. Plant Systematics and Evolution, Biology 3128R1. Sarah Lawrence College, Bronxville, NY  
*Guest Faculty*. 2018. Mapping the Distribution of an Aquatic Invasive in Michigan, Biology 6903I1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2018. Principles of Botany, Biology 3121R1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2018. Photosynthetic Life, General Biology Series 3017R. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2017. Plant Systematics and Evolution, Biology 3128R1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2017. Phylogenetic Theory and Applications: An Evolutionary Study of *Chara* Subsection Willdenowia, Biology 6718I1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2016. DNA Barcoding & Phylogeny: Study of Characeae, a Family of Green Algae, Biology 6717I1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2016. Principles of Botany, Biology 3121R1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2015. Identification of indet. Characeae specimens in the NYBG herbarium using DNA barcoding, Biology 6406W1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2015. Plant Systematics and Evolution, Biology 3128R1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2015. Exploring Historic Collections to Better Understand Algae Utilities, Biology 6404W1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2014. Principles of Botany, Biology 3121R1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2013. Plant Systematics and Evolution, Biology 3128R. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2012. Principles of Botany, Biology 3121R1. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2011. Principles of Botany, Biology 3121R. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2011. Phylogenetic and Morphological Analysis of *Nitella flexilis* L., Biology 4002S (Heather Meyer, Senior Thesis). Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2011. Molecular Phylogenetics of *Chara*: Sections *Chara* and *Desvauxia*, Biology 6404W (Julia Maritz, Independent Study). Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2010. Molecular Systematics of a Cosmopolitan Green Algae Species Complex, Biology 6401W (Julia Maritz, Independent Study). Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2009. Biodiversity and Seed Saving, Biology 6702I (Annabelle Dennis, Independent Study). Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2009. Principles of Botany, Biology 3815R. Sarah Lawrence College, Bronxville, NY

*Guest Faculty*. 2008. Principles of Botany, Biology 3709R. Sarah Lawrence College, Bronxville, NY

*Guest Lecturer*. 2006. Inferring Phylogenies, Genetics 570 (Instructor: J. Felsenstein). University of Washington, Seattle, WA

*Guest Lecturer*. 2006. Phycology: Introduction to Algae, Biology 446 (Instructors: R.J. Waaland & R.A. Cattolico). University of Washington, Seattle, WA

*Graduate Teaching Assistant*. 1998-1999. Plant Biology 101, University of Maryland, College Park, MD

*Instructor*. 1998. Segundo Curso en Técnicas de Genética Molecular para la Conservación y Uso de la Biodiversidad, Centro Internacional de Agricultura Tropical (CIAT), Palmira, Colombia

*Teaching Assistant*. 1996. Phycology 361/461, DePaul University, Chicago, IL

*Undergraduate Independent Research Mentor*. 1998-2003. University of Maryland, College Park, MD

## **Awards and Honors**

*WI-DNR Aquatic Invasive Species Grant Program AIRD10716*. 2016-present. Desiccation, Freezing, and Dispersal of *Nitellopsis obtusa*, \$110,325. The New York Botanical Garden, Bronx, NY

*NSF Research Grant DBI-1348920*. 2017-2018. Dissertation Research: Quantifying Rapid Adaptation in an Aquatic Invasive Algal Species, \$19,751; with Co-Principal Investigator Robin S. Sleith. The New York Botanical Garden, Bronx, NY

*NSF Research Grant DBI-1348920*. 2014-2017. CSBR: Expansion of the New York Botanical Garden Herbarium to Incorporate Newly Acquired Specimens and Improve Curation, \$330,806; with Principal Investigator Barbara M. Theirs and Co-Principal Investigators Roy E. Halling, Andrew J. Henderson and James C. Lendemer. The New York Botanical Garden, Bronx, NY

*NSF Research Grant EF-1304933*. 2013-2018. Digitization TCN: Collaborative Research: The Macroalgal Herbarium Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment, \$3,200,000 (\$694,370 to Co-PI Karol); forty-nine institutions, Principal Investigator Christopher D. Neefus (NHA) plus 5 collaborative proposals (MICH, NCU, NY, UC, WTU). The New York Botanical Garden, Bronx, NY

*NSF Research Grant DEB-1036466*. 2010-2017. ATOL: Collaborative Research: Assembling the Green Algal Tree of Life (GrAToL), \$2,706,890 (\$561,000 to PI Karol); with Co-Principal Investigators Charles F. Delwiche, Louise A. Lewis, Paul O. Lewis, Juan M. Lopez-Bautista and Richard M. McCourt. The New York Botanical Garden, Bronx, NY

*NSF REU Site Grant DBI-1063076*. 2011-2017. REU Site: Calder Summer Undergraduate Research (CSUR) Program in Conservation and Urban Ecology, \$207,058; Senior Personnel with Principal Investigator John D. Wehr and Co-Principle Investigator James D. Lewis. Fordham University, Bronx, NY

*Sarah K. deCoizart Perpetual Charitable Trust*. 2014-2016. Starry Stonewort: Assessing the Threat of an Invasive Freshwater Macro-alga in the Northeast, \$100,000. The New York Botanical Garden, Bronx, NY

*NSF Research Grant DEB-1020660*. 2010-2016. Collaborative Research: Phylogeny and Systematics of the Characeae (Charales), \$445,000 (\$415,000 to PI Karol); with Co-Principal Investigator Richard M. McCourt. The New York Botanical Garden, Bronx, NY

*The Yosemite Fund*. 2008-2009. Unusual Lake Floras, \$174,526 (\$14,800 to K.G. Karol). The New York Botanical Garden, Bronx, NY

*National Institutes of Health - National Research Service Award*. 2006-2007. Genomics/Biology, University of Washington, Seattle, WA

*AAAS/Science Sponsored Membership*. 2004-2006. AAAS/Science Program for Excellence in Science. Nominated by the Dean of the Graduate School, University of Washington, Seattle, WA

*Graduate School Dean's Fellowship*. 2002-2003. University of Maryland, College Park, MD

*College Travel Award*. 2001, 2002. University of Maryland, College Park, MD

*Jacob K. Goldhaber Travel Award*. 2000. University of Maryland, College Park, MD

*Hoshaw Travel Award - Phycological Society of America*. 2000. San Diego, CA

*National Museum of Natural History Graduate Fellowship*. 1999. Smithsonian Institution, Washington, DC

*International Botanical Congress - Green Plant Phylogeny Research Coordination Group Travel Award*. 1999.

*Cell Biology and Molecular Genetics Outstanding Teaching Assistant*. 1998-1999. University of Maryland, College Park, MD

*Personal Recognition for Ingenuity, Drive and Excellence (PRIDE) Award*. 1998. Smithsonian Institution, Washington, DC

*Visiting Fellowship*. February-March 1996. University of New South Wales, Sydney, Australia.

*University Bookstore Academic Excellence Award*. 1991-1992. University of Wisconsin, Madison, WI

#### **Publications — Peer Reviewed Journals (56) (\*contributed equally to this work)**

Gottschalk, S.D. & K.G. Karol. 2020. Survivability of starry stonewort bulbils using commonly available decontamination strategies. *J. Aquat. Plant Manage.* 58: 19-25.

Fučíková, K., P.O. Lewis, S. Neupane, K.G. Karol & L.A. Lewis. 2019. Order, Please! Uncertainty in the Ordinal-Level Classification of Chlorophyceae. *PeerJ* 7:e6899. doi:10.7717/peerj.6899

Muthukrishnan, R., R.S. Sleith, K.G. Karol & D.J. Larkin. 2018. Prediction of starry stonewort (*Nitellopsis obtusa*) invasion risk in upper Midwest lakes using ecological niche models. *Aquatic Bot.* 151: 43-50, doi: 10.1016/j.aquabot.2018.08.001

Nishiyama, T., H. Sakayama, J. de Vries, H. Buschmann, D. Saint-Marcoux, K.K. Ullrich, F.B. Haas, L. Vanderstraeten, D. Becker, D. Lang, S. Vosolobě, S. Rombauts, P.K.I. Wilhelmsson, P. Janitza, R. Kern, A. Heyl, F. Rümpler, L.I.A. Calderón Villalobos, J.M. Clay, R. Skokan, A. Toyoda, Y. Suzuki, H. Kagoshima, E. Schijlen, N. Tajeshwar, B. Catarino, A.J. Hetherington, A. Saltykova, C. Bonnot, H. Breuninger, A. Symeonidi, G.V. Radhakrishnan, F. Van

- Nieuwerburgh, D. Deforce, C. Chang, K.G. Karol, R. Hedrich, P. Ulvskov, G. Glöckner, C.F. Delwiche, J. Petrášek, Y. Van de Peer, J. Friml, M. Beilby, L. Dolan, Y. Kohara, S. Sugano, A. Fujiyama, M. Quint, P.-M. Delaux, G. Theißen, M. Hagemann, J. Harholt, C. Dunand, S. Zachgo, J. Langdale, F. Maumus, D. Van Der Straeten, S. Gould & S.A. Rensing. 2018. The *Chara* genome: secondary complexity and implications for plant terrestrialization. *Cell* 171: 448-464, doi: 10.1016/j.cell.2018.06.033
- Karol, K.G., M.S. Alix, R.W. Scribailo, P.M. Skawinski, R.S. Sleith, J.A. Sardina & J.D. Hall. 2018. New records of the rare North American endemic *Chara brittonii* (Characeae), with comments on its distribution. *Brittonia* 70:277-288, doi: 10.1007/s12228-018-9527-3
- Larkin, D.J., A.K. Monfils, A. Boissezon, R.S. Sleith, P.M. Skawinski, C.H. Welling, B. Cahill & K.G. Karol. 2018. Biology, ecology, and management of starry stonewort (*Nitellopsis obtusa*; Characeae): A Red-listed Eurasian green alga invasive in North America. *Aquatic Bot.* 148: 15-24, doi: 10.1016/j.aquabot.2018.04.003
- Sleith, R.S., J.D. Wehr & K.G. Karol. 2018. Untangling climate and water chemistry to predict changes in freshwater macrophyte distributions. *Ecol. Evol.* 8: 2802–2811, doi: 10.1002/ece3.3847
- McManus, H.A., K. Fučíková, P.O. Lewis, L.A. Lewis & K.G. Karol. 2018. Organellar phylogenomics inform systematics in the green algal family Hydrodictyaceae (Chlorophyceae) and provide clues to the complex evolutionary history of plastid genomes in the green algal tree of life. *Amer. J. Bot.* 105: 315–329, doi:10.1002/ajb2.1066
- Karol, K.G. & R.S. Sleith. 2017. Discovery of the oldest record of *Nitellopsis obtusa* (Charophyceae, Charophyta) in North America. *J. Phycol.* 53: 1106-1108. doi:10.1111/jpy.12557
- Karol, K.G., P.M. Skawinski, R.M. McCourt, M.E. Nault, R. Evans, M.E. Barton, M.S. Berg, S.J. Perleberg, & J.D. Hall. 2017. First discovery of the charophycean green alga *Lychnothamnus barbatus* (Charophyceae) extant in the New World. *Amer. J. Bot.* 104: 1108-1116. doi:10.3732/ajb.1700172
- Labiak, P.H. & K.G. Karol. 2017. Plastomes sequences of the fern family Schizaeaceae reveal remarkable changes in gene content and architecture. *Amer. J. Bot.* 104: 1008-1018. doi:10.3732/ajb.1700135
- McManus, H.A.\*, D.J. Sanchez & K.G. Karol\*. 2017. Plastomes of the green algae *Hydrodictyon reticulatum* and *Pediastrum duplex* (Sphaeropleales, Chlorophyceae). *PeerJ* 5:e3325. doi:10.7717/peerj.3325
- Pérez, W., J.D. Hall, R.M. McCourt, M.T. Casanova & K.G. Karol. 2017. Phylogenetic congruence of ribosomal operon and plastid genes sequences for the Characeae with an emphasis on *Tolypella* (Characeae, Charophyceae). *Phycologia* 56: 230-237.
- Leliaert, F., A. Tronholm, C. Lemieux, M. Turmel, M.S. DePriest, D. Bhattacharya, K.G. Karol, S. Fredericq, F.W. Zechman & J.M. Lopez-Bautista. 2016. Chloroplast phylogenomic analyses reveal the deepest-branching lineage of the Chlorophyta, Palmophyllophyceae class. nov. *Nature* 6: 25367. doi:10.1038/srep25367
- Hall, J.D. & K.G. Karol. 2016. An inventory of the algae (excluding diatoms) of lakes and ponds of Harriman and Bear Mountain State Parks (Rockland and Orange Counties, New York, U.S.A.). *Brittonia* 68: 148-169. doi:10.1007/s12228-016-9409-5
- Sleith, R.S., A.J. Havens, R.A. Stewart & K.G. Karol. 2015. Distribution of *Nitellopsis obtusa* in New York, USA. *Brittonia* 67: 166-172. doi:10.1007/s12228-015-9372-6
- Pérez, W., J.D. Hall, R.M. McCourt & K.G. Karol. 2015. Oospore dimensions and morphology in North American *Tolypella* (Charophyceae, Charophyta) *J. Phycol.* 51: 310-320. doi:10.1111/jpy.12275
- Pérez, W., J.D. Hall, R.M. McCourt & K.G. Karol. 2014. Phylogeny of North American *Tolypella* (Charophyceae, Charophyta) based on plastid DNA sequences with a description of *Tolypella ramosissima* sp. nov. *J. Phycol.* 50: 776-789. doi:10.1111/jpy.12219
- Casanova, M.T. & K.G. Karol. 2014. A revision of ecorticate species of *Chara* (subg. *Charopsis*, sect. *Protochara* (Womersley and Ophel) Casanova and K.G. Karol, *comb. et stat. nov.*) (Characeae: Charophyceae). *Aust. Syst. Bot.* 27: 23-27. doi:10.1071/SB13016
- Meyer, R.S., S. Knapp, K.G. Karol, D.P. Little, M.H. Nee & A. Litt. 2013. Reply to J. Samuels: Taxonomic notes on several wild relatives of *Solanum melongena* L. *Mol. Phylo. Evol.* 69: 306-307. doi:10.1016/j.ympev.2013.05.025
- Zimmer, E.A., Y. Suh & K.G. Karol. 2012. Phylogenetic placement of a recently described taxon in the genus *Pleodendron* (Canellaceae). *Phytologia*, 94: 400-408.

- Meyer, R.S., K.G. Karol, D.P. Little, M.H. Nee & A. Litt. 2012. Phylogeographic relationships among Asian eggplants and new perspectives on eggplant domestication. *Mol. Phylo. Evol.* 63: 685-701. doi:10.1016/j.ympev.2012.02.006
- Banks, J., T. Nishiyama, M. Hasebe, J.L. Bowman, M. Gribskov, C. dePamphilis, V.A. Albert, N. Aono, T. Aoyama, B.A. Ambrose, N.W. Ashton, M.J. Axtell, E. Barker, M.S. Barker, J.L. Bennetzen, N.D. Bonawitz, C. Chapple, C. Cheng, L.G.G. Correa, M. Dacre, J. DeBarry, I. Dreyer, M. Elias, E.M. Engstrom, M. Estelle, L. Feng, C. Finet, S.K. Floyd, W.B. Frommer, T. Fujita, L. Gramzow, M. Gutensohn, J. Harholt, M. Hattori, A. Heyl, T. Hirai, Y. Hiwatashi, M. Ishikawa, M. Iwata, K.G. Karol, B. Koehler, U. Kolukisaoglu, M. Kubo, T. Kurata, S. Lalonde, K. Li, Y. Li, A. Litt, E. Lyons, G. Manning, T. Maruyama, T.P. Michael, K. Mikami, S. Miyazaki, S-I. Morinaga, T. Murata, B. Mueller-Roeber, D.R. Nelson, M. Obara, Y. Oguri, R.G. Olmstead, N. Onodera, B.L. Petersen, B. Pils, M. Prigge, S.A. Rensing, D.M. Riaño-Pachón, A.W. Roberts, Y. Sato, H.V. Scheller, B. Schulz, C. Schulz, E.V. Shakirov, N. Shibagaki, N. Shinohara, D.E. Shippen, I. Sørensen, R. Sotooka, N. Sugimoto, M. Sugita, N. Sumikawa, M. Tanurdzic, G. Theißen, P. Ulvskov, S. Wakazuki, J-K. Weng, W.W.G.T. Willats, D. Wipf, P.G. Wolf, L. Yang, A.D. Zimmer, Q. Zhu, T. Mitros, U. Hellsten, D. Loqué, R. Otilar, A. Salamov, J. Schmutz, H. Shapiro, E. Lindquist, S. Lucas, D. Rokhsar & I. Grigoriev. 2011. The *Selaginella* genome identifies genetic changes associated with the evolution of vascular plants. *Science*, 332: 960-963. doi:10.1126/science.1203810
- Hall, J.D., K. Fučíková, C. Lo, L.A. Lewis & K.G. Karol. 2010. Assessing proposed DNA barcodes in the green algae. *Cryptogamie: Algol.*, 31: 529-555. doi:10.1007/s11802-014-2197-1
- Karol, K.G., K. Arumuganathan, J.L. Boore, A.M. Duffy, K.D.E. Everett, J.D. Hall, S.K. Hansen, J.V. Kuehl, D.F. Mandoli, B.D. Mishler, R.G. Olmstead, K.S. Renzaglia & P.G. Wolf. 2010. Complete plastome sequences of *Equisetum arvense* and *Isoetes flaccida*: implications for phylogeny and plastid genome evolution of early land plant lineages. *BMC Evol. Biol.*, 10:321. doi:10.1186/1471-2148-10-321
- Karol, K.G., M.A. Jacobs, Y. Zhou, E.H. Sims, W.D. Gillett & R.A. Cattolico. 2010. Comparative analysis of complete mitochondrial genome sequences from two geographically distinct *Heterosigma akashiwo* (Raphidophyceae) strains. *Nova Hedwigia*, 136: 261-282.
- Oliver, M.J., A.G. Murdock, B.D. Mishler, J.V. Kuehl, J.L. Boore, D.F. Mandoli, K. Everett, P.G. Wolf & K.G. Karol. 2010. Chloroplast genome sequence of the moss *Tortula ruralis*: gene content, polymorphism, and structural arrangement relative to other green plant chloroplast genomes. *BMC Genomics*, 11:143. doi:10.1186/1471-2164-11-143
- Casanova, M.T. & K.G. Karol. 2008. Monoecious *Nitella* species (Characeae, Charophyta) from south-eastern mainland Australia including *Nitella paludigena* sp. nov. *Aust. Syst. Bot.* 21: 201-216.
- Hall, J.D., K.G. Karol, R.M. McCourt & C.F. Delwiche. 2008. Phylogeny of the conjugating green algae based on chloroplast and mitochondrial nucleotide sequence data. *J. Phycol.*, 44: 467-477. doi:10.1111/j.1529-8817.2008.00485.x
- Duplessis\*, M.R., K.G. Karol\*, E.T. Adman, L.Y.S. Choi, M.A. Jacobs & R.A. Cattolico. 2007. Chloroplast His-to-Asp signal transduction: a potential mechanism for plastid gene regulation in *Heterosigma akashiwo* (Raphidophyceae). *BMC Evol. Biol.*, 7:70. doi:10.1186/1471-2148-7-70
- Casanova, M.T., M.D. de Winton, K.G. Karol & J.S. Clayton. 2007. *Nitella hookeri* A. Braun (Characeae, Charophyta) in New Zealand and Australia: implications for endemism, speciation and biogeography. *Charophytes*, 1: 2-18.
- Roper, J., S.K. Hanson, P.G. Wolf, K.G. Karol, D.F. Mandoli, K.D.E. Everett, J. Kuehl & J.L. Boore. 2007. The complete plastid genome sequence of *Angiopteris evecta* (G. Forst.) Hoffm. *Amer. Fern J.*, 97: 95-106.
- Hausner, G., R. Olsen, I. Johnson, D. Simon, E.R. Sanders, K.G. Karol, R.M. McCourt & S. Zimmerly. 2006. Origin and evolution of the chloroplast *trnK* (*matK*) intron: a model for evolution of group II intron RNA structures. *Mol. Biol. Evol.*, 23: 380-391.
- Drummond, C.S., J. Hall, K.G. Karol, C.F. Delwiche & R.M. McCourt. 2005. Phylogeny of *Spirogyra* and *Sirogonium* (Zygnematophyceae) based on *rbcL* sequence data. *J. Phycol.*, 41: 1055-1064.
- Wolf, P.G., K.G. Karol, D.F. Mandoli, J. Kuehl, K. Arumuganathan, M.W. Ellis, B.D. Mishler, D.G. Kelch, R.G. Olmstead & J.L. Boore. 2005. The first complete chloroplast genome sequence of a lycophyte, *Huperzia lucidula* (Lycopodiaceae): implications for land plant phylogeny. *Gene*, 350: 117-128.
- McCourt, R.M., C.F. Delwiche & K.G. Karol. 2004. Charophyte algae and land plant origins. *TREE* 19: 661-666.

- Sanders, E.R., K.G. Karol & R.M. McCourt. 2003. Occurrence of *matK* in a *trnK* group II intron in charophyte green algae, and phylogeny of the Characeae. *Amer. J. Bot.*, 90: 628-633.
- Whitlock, B.A., K.G. Karol & W.S. Alverson. 2003. Chloroplast DNA sequences confirm the placement of the enigmatic *Oceanopapaver* within Grewioideae (Malvaceae s.l., formerly Tiliaceae). *Int. J. Plant Sci.*, 64: 35-41.
- Delwiche, C.F., K.G. Karol, M.T. Cimino & K.J. Sytsma. 2002. Phylogeny of the genus *Coleochaete* and related taxa based on the chloroplast gene *rbcL*. *J. Phycol.*, 38: 394-403.
- Karol, K.G., R.M. McCourt, M.T. Cimino & C.F. Delwiche. 2001. The closest living relatives of land plants. *Science*, 294: 2351-2353.
- Karol, K.G., Y. Suh, G.E. Schatz & E.A. Zimmer. 2000. Molecular evidence for the phylogenetic position of *Takhtajania* in the Winteraceae: inference from nuclear ribosomal and chloroplast gene spacer sequences. *Ann. Mo. Bot. Gard.*, 87: 414-432.
- McCourt, R.M., K.G. Karol, J. Bell, M.F. Wojciechowski, K. Helm-Bychowski, A. Grajewska, N. Park & R.W. Howshaw. 2000. Phylogeny of the Zygnematales and Desmidiaceae (Chlorophyta: Charophyceae) based on *rbcL* sequences. *J. Phycol.*, 36: 747-758.
- Cimino, M.T., K.G. Karol & C.F. Delwiche. 2000. An artifact in the SSU rDNA sequence of *Chaetosphaeridium globosum* (Chlorophyta: Charophyceae). *J. Phycol.*, 36: 440-442.
- Karol, K.G., J.E. Rodman, E. Conti & K.J. Sytsma. 1999. Nucleotide sequence of *rbcL* and phylogenetic relationships of *Setchellanthus caeruleus* (Setchellanthaceae). *Taxon*, 48: 303-315.
- McCourt, R.M., K.G. Karol, M.T. Casanova & M. Feist. 1999. Monophyly of genera and species of Characeae based on *rbcL* sequences, with special reference to Australian and European *Lychnothamnus barbatus* (Characeae: Charophyceae). *Aust. J. Bot.*, 47: 361-369.
- Rodman, J.E., P.S. Soltis, D.E. Soltis, K.J. Sytsma & K.G. Karol. 1998. Parallel evolution of glucosinolate biosynthesis inferred from congruent nuclear and plastid gene phylogenies. *Amer. J. Bot.*, 85: 997-1006.
- Alverson, W.S., K.G. Karol, D.A. Baum, M.W. Chase, S.M. Swensen, R.M. McCourt & K.J. Sytsma. 1998. Circumscription of the Malvales and relationships to other Rosids: evidence from *rbcL* sequence data. *Amer. J. Bot.*, 85: 876-887.
- Morton, C.M., S.C. Mori, G.T. Prance, K.G. Karol & M.W. Chase. 1997. Phylogenetic relationships of Lecythidaceae: A cladistic analysis using *rbcL* sequence and morphological data. *Amer. J. Bot.*, 84: 530-540.
- Morton, C.M., K.G. Karol & M.W. Chase. 1997. Taxonomic affinities of *Physena* (Physenaceae) and *Asteropeia* (Theaceae). *Bot. Rev.*, 63: 231-239.
- Park, N.E., K.G. Karol & R.M. McCourt. 1996. Phylogeny of *Gonatozygon* and *Genicularia* (Gonatozygaceae, Desmidiaceae) based on *rbcL* sequences. *Eur. J. Phycol.*, 31: 309-313.
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- McCourt, R.M., K.G. Karol, M. Guerlesquin & M. Feist. 1996. Phylogeny of extant genera in the family Characeae (Charales, Charophyceae) based on *rbcL* sequences and morphology. *Amer. J. Bot.*, 83: 125-131.
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- Chase, M.W., D.E. Soltis, R.G. Olmstead, D. Morgan, D.H. Les, B.D. Mishler, M.R. Duvall, R.A. Price, H.G. Hills, Y. Qiu, K.A. Kron, J.H. Rettig, E. Conti, J.D. Palmer, J.R. Manhart, K.J. Sytsma, H.J. Michaels, W.J. Kress, K.G. Karol, W.D. Clark, M. Hedren, B.S. Gaut, R.K. Jensen, K. Kim, C.F. Wimpee, J.F. Smith, G.R. Furnier, S.H. Strauss, Q. Xiang, G.M. Plunkett, P.M. Soltis, S. Swensen, S.E. Williams, P.A. Gadek, C.J. Quinn, L.E. Eguiarte, E. Golenberg, G.H. Learn, Jr., S.W. Graham, S.C.H. Barrett, S. Dayanandan & V.A. Albert. 1993. Phylogenetics of seed plants: an analysis of nucleotide sequences from the plastid gene *rbcL*. *Ann. Mo. Bot. Gard.*, 80: 528-580.

Gadek, P.A., C.J. Quinn, J.E. Rodman, K.G. Karol, E. Conti, R.A. Price & E.S. Fernando. 1992. Affinities of the Australian endemic Akaniaceae: New evidence from *rbcL* sequences. *Aust. Syst. Bot.*, 5: 717-724.

### **Publications — Book Chapters (16)**

- Mishler, B.D., J.D. Hall, R.M. McCourt, K.G. Karol, C.F. Delwiche & L.A. Lewis. 2020. *Viridiplantae*, Pp. 179-182 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Hall, J.D., L.A. Lewis, R.M. McCourt, C.F. Delwiche, B.D. Mishler & K.G. Karol. 2020. *Chlorophyta*, Pp. 183-186 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Karol, K.G., R.M. McCourt, B.D. Mishler, C.F. Delwiche & J.D. Hall. 2020. *Charophyta*, Pp. 187-189 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Hall, J.D., C.F. Delwiche & K.G. Karol. 2020. *Klebsormidiophyceae*, Pp. 191-193 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Hall J.D., R.M. McCourt, C.F. Delwiche, B.D. Mishler & K.G. Karol. 2020. *Phragmoplastophyta*, Pp. 195-197 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Hall, J.D., R.M. McCourt & K.G. Karol. 2020. *Zygnematophyceae*, Pp. 199-201 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Delwiche, C.F., K.G. Karol & J.D. Hall. 2020. *Coleochaetophyceae*, Pp. 203-204 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Karol, K.G., R.M. McCourt & J.D. Hall. 2020 *Charophyceae*, Pp. 205-207 in *Phylonyms: a Companion to the PhyloCode*, de Queiroz, K., P.D Cantino & J. Gauthier (eds.). CRC Press, Boca Raton, FL.
- Karol, K.G. 2019. Key to Known Upper Midwestern Characeae, in: *Aquatic Plants of the Upper Midwest: A photographic field guide to our underwater forests, fourth edition*, p. 233. P.M. Skawinski (ed.), Stevens Point, Wisconsin.
- Karol, K.G. 2018. Key to Known Upper Midwestern Characeae, in: *Aquatic Plants of the Upper Midwest: A photographic field guide to our underwater forests, third edition*, p. 233. P.M. Skawinski (ed.), Stevens Point, Wisconsin.
- McCourt, R.M., K.G. Karol, J.D. Hall, M.T. Casanova & M.C. Grant. 2016. Charophyceae (Charales), in: *Handbook of the Protists*, pp. 1-20. Archibald, J.M., et al. (eds.). Springer International Publishing, Switzerland. doi:10.1007/978-3-319-32669-6\_40-1
- Karol, K.G. 2014. Key to Known Upper Midwestern Characeae, in: *Aquatic Plants of the Upper Midwest: A photographic field guide to our underwater forests, second edition*, p. 166. P.M. Skawinski (ed.), Stevens Point, Wisconsin.
- Wolf, P.G & K.G. Karol. 2012. Plastomes of bryophytes, lycophytes and ferns, in: *Advances in Photosynthesis and Respiration. Vol. "Genomics of chloroplasts and mitochondria,"* Vol. 35, pp. 89-102. Bock, R. & V. Knoop (eds.). Springer, Dordrecht.
- Karol, K.G. & M.T. Casanova. 2007. Klebsormidiales, Coleochaetales and other early diverging lineages of the Charophyta, in: *Algae of Australia: Introduction*, pp. 356-362. McCarthy, P.M. & A.E. Orchard (eds.). Australian Biological Resources Study, Canberra; CSIRO Publishing, Melbourne.
- Feist, M., N. Grambast-Fessard, M. Guerlesquin, K.G. Karol, H.-N. Lu, R.M. McCourt, Q.-F. Wang & S.-Z. Zhang. 2005. Protista (Charophyta). in: *Treatise on Invertebrate Paleontology*, Part B, Vol. 1. Geological Society of America and the University of Kansas Press.
- Chapman, R.L., M.A. Buchheim, C.F. Delwiche, T. Friedl, V.A.R. Huss, K.G. Karol, L.A. Lewis, J. Manhart, R.M. McCourt, J.L. Olsen & D.A. Waters. 1998. Molecular systematics of the green algae, in: *Molecular Systematics of Plants II*, pp. 508-540. Soltis, D.E., P.S. Soltis & J.J. Doyle (eds.). Kluwer Academic Publishers, Boston.
- McCourt, R.M., S.T. Meiers, K.G. Karol & R.L. Chapman. 1996. Molecular systematics of the Charales, in: *Cytology, Genetics and Molecular Biology of the Algae*, pp. 323-336. Chaudhary, B.R. & S.B. Agrawal (eds.). SPB Academic Publishing, Amsterdam.

## Invited Papers (14)

- Karol, K.G. 2018. The Characeae of the Upper Midwest. *Aquatic Plant Identification and Sampling*, UW - Stevens Point. Stevens Point, WI
- Karol, K.G. 2014. From collections to clades: Insights into the evolution of green plants. *Botany Seminar Series*, The New York Botanical Garden, Bronx, NY
- Karol, K.G. 2013. From collections to clades: Insights into the evolution of green plants. *Botany Seminar Series*, National Museum of Natural History, Smithsonian Institution, Washington, DC
- Karol, K.G. 2011. Genes and genomes: What they reveal about freshwater green algal diversity and early land plant evolution. *Appalachian Laboratory Seminar Series*, University of Maryland Center for Environmental Science, Frostburg, MD
- Karol, K.G. 2010. Genes and genomes: What they reveal about the evolution of green plants. *Harvard University Herbaria Seminar Series*, Harvard University, Cambridge, MA
- Karol, K.G. 2009. Genes, gyrogonites and genomes: What they reveal about the evolution of green plants. University of Buffalo, Buffalo, NY
- Karol, K.G. 2008. Genes, gyrogonites and genomes: What they reveal about the evolution of green plants. Lehman College CUNY, Bronx, NY
- Karol, K.G. 2007. Genes, gyrogonites and genomes: What they reveal about the evolution of green plants. University of Washington, Seattle, WA
- Karol, K.G. 2004. Phylogenetic studies in the Characeae: the closest living relatives of land plants. University of California, Berkeley, CA
- Karol, K.G. 2002. Phylogenetic studies in the Characeae: the closest living relatives of land plants. *Harvard University Herbaria Seminar Series*, Harvard University, Cambridge, MA
- Karol, K.G., R.M. McCourt, M. Feist & C.F. Delwiche. 2002. Estimating divergence times within the Charophyta: a Bayesian approach using fossil and DNA sequence data. *Green Algal Conquests of the Land: Many Conquests, One Victory?* Botany 2002, PSA Symposium, Madison, WI
- McCourt, R.M., K.G. Karol & C.F. Delwiche. 2002. The roots of land plants: recent research on early-diverging lineages in the evolution of higher drier algae. *Green Algal Conquests of the Land: Many Conquests, One Victory?* Botany 2002, PSA Symposium, Madison, WI
- Delwiche, C.F., K.G. Karol & R.M. McCourt. 2002. One small step: why did the charophytes have the right stuff? *Green Algal Conquests of the Land: Many Conquests, One Victory?* Botany 2002, PSA Symposium, Madison, WI
- Karol, K.G., R.M. McCourt, V. Proctor, M. Feist & C.F. Delwiche. 2000. Preliminary molecular analyses of tribe Nitelleae (Characeae) using *rbcL* sequence data. *The Third International Symposium on Extant and Fossil Charophytes*, Nanjing, Peoples Republic of China

## Workshops (15)

- Karol, K.G., R.E. Weitzell Jr., J.D. Hall & D.J. Perleberg. 2019. The Characeae of Minnesota. *MN-DNR Aquatic Plant Training Workshop*. Itasca, MN
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2019. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2019. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Green Lake, WI
- Karol, K.G., R.E. Weitzell Jr., J.D. Hall & D.J. Perleberg. 2018. The Characeae of Minnesota. *MN-DNR Aquatic Plant Training Workshop*. Itasca, MN
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2018. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2018. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Hatley, WI



- Karol, K.G., P.M. Skawinski & J.D. Hall. 2017. The Characeae of Minnesota. *MN-DNR Aquatic Plant Training Workshop*. Itasca, MN
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2017. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2017. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Amherst Junction, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2016. The Characeae of Minnesota. *MN-DNR Aquatic Plant Training Workshop*. Itasca, MN
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2016. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2015. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. East Troy, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2015. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2014. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI
- Karol, K.G., P.M. Skawinski & J.D. Hall. 2013. The Characeae of Wisconsin. *WI-DNR Aquatic Plant Training Workshop*. Woodruff, WI

### **Postdoctoral Fellows and Visiting Scientists (3)**

- Labiak, P.H. 2017. Visiting Scientist, Universidade Federal do Paraná, Brasil
- Wehr, J.D. 2015-2016. Visiting Scientist, Fordham University. Bronx, NY
- Hall, J.D., 2008-2011. Cullman Postdoctoral Fellow, The New York Botanical Garden, Bronx, NY

### **Graduate Students (7)**

- MS. Committee Member* - Neuman, E., 2020-Present. Star Wars: Phenology of *Nitellopsis obtusa* (starry stonewort) in Pentwater Lake, Michigan. Grand Valley State University, Allendale, MI.
- MS. Advisor* - Glass, S.E., 2017-Present. Organellar genome evolution in the Klebsormidiophyceae. Lehman College, Bronx, NY.
- Ph.D. Co-Advisor* - Gottschalk, S.D., 2014-Present. Phylogeography and population genetics of freshwater green algae. Fordham University, Bronx, NY.
- Ph.D. Advisor* - Sleith, R.S., 2018 (M.Phil. 2016). City University of New York, Plant Sciences Ph.D. Subprogram, Lehman College, Bronx, NY. Distribution and population structure of the invasive *Nitellopsis obtusa* and native species of Characeae in Northeastern U.S.A.
- Ph.D. Committee Member* - Whorley, S., 2015. Anthropogenic effects on stream periphyton. Fordham University, Bronx, NY. Currently working on her Ph.D.
- Ph.D. Co-Advisor* - Wang, X., 2014. Organellar genome evolution and phylogeographic relationships among populations of freshwater brown algae: *Heribaudiella fluviatilis*, *Bodanella lauterborni* and *Pleurocladia lacustris*. Fordham University, Bronx, NY.
- Ph.D. Advisor* - Pérez, W., 2014 (M.Phil. 2010). A Systematic revision of North American *Tolypella* A. Braun (Charophyceae, Charophyta). City University of New York, Plant Sciences Ph.D. Subprogram, Lehman College, Bronx, NY.

### **Research Technicians (7)**

- Sardina, J.A., 2017. NSF-Tree of Life Research Technician. Cullman Program, The New York Botanical Garden, Bronx, NY
- Havens, A.J., 2014-Present. deCoizart and NSF-Tree of Life Field Technician. Cullman Program, The New York Botanical Garden, Bronx, NY

Cavaliere, D.J., 2014-Present. NSF-Systematics Research Technician. Cullman Program, The New York Botanical Garden, Bronx, NY

Stewart, R.A., 2014. deCoizart-Field Technician. Cullman Program, The New York Botanical Garden, Bronx, NY

Tiernan, N.M., 2014. NSF-Systematics Research Technician. Cullman Program, The New York Botanical Garden, Bronx, NY

Sleith, R.S., 2010-2012. NSF-Systematics Research Technician. Cullman Program, The New York Botanical Garden, Bronx, NY

Hancock, L.P., 2010-2012. NSF-Tree of Life Research Technician. Cullman Program, The New York Botanical Garden, Bronx, NY

### **Undergraduate Students, Interns and Volunteers (28)**

Fisher, J.P., 2019. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Columbo, M., 2019. NYBG Volunteer. Graduate of Sarah Lawrence College, Bronxville, NY

Davis, V.M., 2018-2019. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Zorn, J.F., 2018-2019. NYBG Volunteer. Graduate of Sarah Lawrence College, Bronxville, NY

Howe, M. 2018. NYBG Volunteer. Graduate of Greenwich Academy High School, Greenwich, CT

Bilek, I., 2015-2017. NYBG Volunteer and Suzanne Salter Arkin Science Extern. Student at Sarah Lawrence College, Bronxville, NY

Sardina, J.A., 2016-2017. NYBG Volunteer. Graduate from University of Wisconsin – Madison, Madison, WI

Beros, J., 2015-2016. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Glass, S.E., 2015-2016. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Valeruz, H.S., 2014-2016. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

deRoux, C.J., 2015. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Lawson, H., 2014-2015 NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Guerin, B.S., 2014-2015 NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Lenski, J.G., 2014-2015 NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Sanches, M.C., 2014-2015. NYBG Volunteer. Student at New York University, New York, NY

Perfect, E., 2014-2015. NYBG Volunteer. The School of Visual Arts – New York, postgraduate, New York, NY

Kahn, B.C.M., 2014. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Min, E., 2013-2014. NYBG Volunteer. Student at Sarah Lawrence College, Bronxville, NY

Proenca, K., 2013. NSF-REU Calder Summer Undergraduate Research Fellow. Student at Juniata College, Huntingdon, PA

Janis, J.A., 2012-2014. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Stewart, R.A., 2012-2013. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Ospina, S.C., 2011. NYC Alliance Bridge to Doctorate Intern, New York, NY

Peavey, T.M., 2010-2011. NYBG Intern. Student at Fordham University, Bronx, NY

Eliach, A.M., 2010. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Maritz, J.M., 2009-2012. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Dennis, A.C., 2009. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Meyer, H.M., 2008-2011. NYBG Intern. Student at Sarah Lawrence College, Bronxville, NY

Cusumano, L.R., 2008-2009. NYBG Everett Intern. Student at Fordham University, Bronx, NY

### **Public Service**

*Expert Panel Member* - Great Lakes Basin Starry Stonewort Collaborative, Finger Lakes Institute, Hobart and William Smith Colleges, NY. 2018-Present.

*Associate Editor* - *Brittonia*, 2018-Present.

*Member at Large - Northeast Algal Society. 2015-2017.*

*Appointed Member - Phycological Society of America Program Committee. 2015-2016.*

*Subject Editor - PhytoKeys. 2010-2018.*

*Appointed Member - Phycological Society of America Education Committee. 2012-2014.*

*Advisory Board - Assembling the Heterokont Tree of Life. 2007-2012.*

*Student Award Judge - Phycological Society of America Annual Meeting, Honolulu HI. 2009.*