

Erin Molloy

PhD Candidate
Department of Computer Science
University of Illinois at Urbana-Champaign
emolloy2@illinois.edu
erinkmolloy.web.illinois.edu

EDUCATION

Expected 05/2020	PhD., Computer Science, University of Illinois at Urbana-Champaign Specialization: Computational biology, Parallel computing Advisors: Tandy Warnow and William Gropp
2011	A.B., Physics, University of Chicago

AWARDS AND FUNDING

Fellowships

2017	Ira & Debra Cohen Graduate Fellowship in Computer Science
2015	NSF Graduate Research Fellowship
2014	Thomas M. Siebel Fellowship
2013	NSF IGERT Fellowship
2013	State Farm Companies Foundation Doctoral Scholarship

Teaching Awards

2017	List of Teachers Ranked as Excellent by their Students <i>Summary:</i> Awarded based on student feedback collected by the university for my discussion section, CS 466 Introduction to Bioinformatics.
2015	List of Teachers Ranked as Excellent by their Students <i>Summary:</i> Awarded based on student feedback collected by the university for my discussion section, CS 450 Numerical Analysis.

Computational Resources

2018	Exploratory Allocation on the Blue Waters supercomputer <i>Summary:</i> Awarded 50,000 node hours for my proposal, Optimizing distributed-memory parallel code for constructing ultra-large phylogenetic trees on Blue Waters.
2017	Exploratory Allocation on the Blue Waters supercomputer <i>Summary:</i> Awarded 50,000 node hours for my proposal, Designing scalable algorithms for constructing large phylogenetic trees (almost without alignments) on supercomputers.

Travel / Housing Support

- 2019 | **Trees in Desert: A workshop on ultra-large phylogenetic trees**
Summary: Awarded to give a presentation/tutorial on new divide-and-conquer approaches for species tree estimation to systematic biologists.
- 2018 | **Science at Extreme Scales: Big Data Meets Large-Scale Computing**
Summary: Awarded a 3-month residency at the Institute for Pure and Applied Mathematics (IPAM).

RESEARCH EXPERIENCE

- 2011–13 | **Associate Research Specialist**
 Departments of Psychiatry and Medical Physics, University of Wisconsin-Madison

TEACHING EXPERIENCE

- 2017 | **Teaching Assistant, Introduction to Bioinformatics (spring)**
 Department of Computer Science, University of Illinois at Urbana-Champaign
- 2016–17 | **Computer Science Instructor, New Teaching Assistant Training**
 Center for Innovation in Teaching and Learning, University of Illinois
- 2015 | **Teaching Assistant, Numerical Analysis (spring)**
 Department of Computer Science, University of Illinois at Urbana-Champaign
- 2012 | **Ad Hoc Laboratory Assistant, Methods for Neuroimaging Research (fall)**
 Department of Medical Physics, University of Wisconsin-Madison

PUBLICATIONS

Peer-reviewed Journal Articles

- 2019 | **E. Molloy** and T. Warnow. TreeMerge: A new method for improving the scalability of species tree estimation methods. Accepted to *Bioinformatics* (Special Issue for **ISMB/ECCB 2019**).
- 2019 | **E. Molloy** and T. Warnow. Statistically consistent divide-and-conquer pipelines for phylogeny estimation using NJMerge. Conditionally accepted to *Algorithms for Molecular Biology* (Special Issue for **RECOMB-CG 2018**); Pre-print available here: <https://www.biorxiv.org/content/10.1101/469130v6>.
- 2018 | M. Nute, J. Chou, **E. Molloy**, T. Warnow. The Performance of Coalescent-Based Species Tree Estimation Methods under Models of Missing Data. *BMC Genomics* 19(Special Issue for **RECOMB-CG 2017**), Article 286, 22 pages.
- 2018 | S. Christensen, **E. Molloy**, P. Vachaspati, T. Warnow. OCTAL: Optimal completion of gene trees in polynomial time. *Algorithms for Molecular Biology* 13(Special Issue for **WABI 2017**), Article 6, 18 pages.
- 2017 | **E. Molloy** and T. Warnow. To include or not to include: The Impact of Gene Filtering on Species Tree Estimation Methods. *Systematic Biology* 67(2), 285–303.

- 2017 M. Kruepke, **E. Molloy**, K.W. Bresin, A.K. Barbey, E. Verona. A Brief Assessment Tool for Investigating Facets of Moral Judgment from Realistic Moral Vignettes. *Behavior Research Methods* 50(3), 922-936.
- 2015 R. Patriat, **E. Molloy**, R. Birn. Using Edge Voxel Information to Improve Motion Regression for rs-fMRI Connectivity Studies. *Brain connectivity* 5(9), 582-595.
- 2014 **E. Molloy**, M. Meyerand, R. Birn. The influence of spatial resolution and smoothing on the detectability of resting-state and task fMRI. *Neuroimage* 86, 221-230.
- 2014 R. Birn, M.D. Cornejo, **E. Molloy**, R. Patriat, T.B. Meier, G.R. Kirk, V.A. Nair, M.E. Meyerand, V. Prabhakran. The Influence of Physiological Noise Correction on Test-Retest Reliability of Resting-State Functional Connectivity. *Brain connectivity* 4(7), 511-522.
- 2013 R. Birn, **E. Molloy**, R. Patriat, T. Parker, T.B. Meier, G.R. Kirk, V.A. Nair, M.E. Meyerand, V. Prabhakran. The effect of scan length on the reliability of resting-state fMRI connectivity estimates. *Neuroimage* 83, 550-558.
- 2013 R. Patriat, **E. Molloy**, T.B. Meier, G.R. Kirk, V.A. Nair, M.E. Meyerand, V. Prabhakran, R.M. Birn. The effect of resting condition on resting-state fMRI reliability and consistency: A comparison between resting with eyes opened, closed, and fixated. *Neuroimage* 78, 463-473.
- 2012 C.A. Burghy, D.E. Stodola, P.L. Ruttle, **E. Molloy**, J.M. Armstrong, J.A. Oler, M.E. Fox, A.S. Hayes, N.H. Kalin, M.J. Essex, R.J. Davidson, R.M. Birn. Developmental pathways to amygdala-prefrontal function and internalizing symptoms in adolescence. *Nature Neuroscience* 15(12), 1736-1741.

Peer-reviewed Conference Proceedings

- 2019 T. Le, A. Sy, **E. Molloy**, Q. Zhang, S. Rao, T. Warnow. Using INC within Divide-and-Conquer Phylogeny Estimation. Accepted to the *6th International Conference on Algorithms for Computational Biology (AICoB 2019)*.
- 2018 **E. Molloy** and T. Warnow. NJMerge: A Generic Technique for Scaling Phylogeny Estimation Methods and Its Application to Species Trees. In: *the 16th RECOMB Comparative Genomics Satellite Workshop (RECOMB-CG 2018)*, Springer Lecture Notes in Computer Science, Vol. 11183, 260-276.
- 2017 S. Christensen, **E. Molloy**, P. Vachaspati, T. Warnow. Optimal completion of incomplete gene trees in polynomial time using OCTAL. In: *the 17th International Workshop on Algorithms and Bioinformatics (WABI 2017)*, Leibniz International Proceedings in Informatics, Vol. 88, Article 27, 14 pages.

Invited Book Chapters

- 2019 **E. Molloy** and T. Warnow. Large-scale Species Tree Estimation. Pre-print available here: <https://arxiv.org/abs/1904.02600>.

PRESENTATIONS

Conference / Workshop Talks

- 2019 | New divide-and-conquer approaches for constructing species trees from large genomic datasets. *Trees in the Desert: A workshop on ultra-large phylogenetic trees*, Oracle (AZ, USA), April 13.
- 2018 | Scaling species tree estimation methods to large datasets using NJMerge. *HPC and Data Science for Scientific Discovery Workshop*, Institute for Pure and Applied Mathematics, Los Angeles (CA, USA), November 8.
- 2018 | NJMerge: A Generic Technique for Scaling Phylogeny Estimation Methods and Its Application to Species Trees. *16th International Conference on Comparative Genomics (RECOMB-CG)*, Magog-Orford (QC, Canada), October 11.
- 2018 | Scaling species tree estimation methods to large datasets using NJMerge. *Phylogenomics Software Symposium*, Montpellier (France), August 17.
- 2018 | Designing parallel algorithms for constructing large phylogenetic trees on Blue Waters, *NCSA Blue Waters Symposium for Petascale Science and Beyond*, Sunriver (OR, USA), June 5.
- 2016 | To include or not to include: The impact of missing data on summary methods for species tree estimation. *Evolution*, Austin (TX, USA), June 18.
- 2016 | To include or not to include: The impact of missing data on summary methods for species tree estimation. *Phylogenomics Symposium and Software School*, Austin (TX, USA), June 16.
- 2015 | Is the ideal prolongation operator always “ideal” for a particular coarse/fine splitting? *17th Copper Mountain Conference on Multigrid Methods*, Copper Mountain (CO, USA), March 26. (Work with L. Olson and J. Schroder)

Hands-on Tutorials

- 2019 | Species tree estimation using new divide-and-conquer pipelines. *Trees in the Desert: A workshop on ultra-large phylogenetic trees*, Oracle (AZ, USA), April 13.
- 2017 | Metagenomic Analysis using Phylogeny-Aware Profiles. *Strategies and Techniques for Analyzing Microbial Population Structures*, Woods Hole (MA, USA), August 6.

Posters

- 2016 | To include or not to include: The impact of missing data on summary methods for species tree estimation. *Molecules as documents of evolutionary history*, CNRS, Roscoff (France), May.
- 2007 | Bypassing Replicative Senescence in Primary Mouse Mammary Tumor Cells with Viral Oncogenes. *Intel International Science and Engineering Fair*, Albuquerque (NM, USA), May. (Work with J.A. Gershan and R. Orentas)

UNDERGRADUATE STUDENT SUPERVISION

- | | |
|------|--|
| 2019 | <p>Warnow Lab
 Department of Computer Science, University of Illinois at Urbana-Champaign
 Student: Emma Hamel</p> |
| 2017 | <p>Illinois Geometry Laboratory (fall)
 Department of Mathematics, University of Illinois at Urbana-Champaign
 Students: Wendi Chen, Sijia Huo, Pengzheng Zhang, Ruizhe Zhou
 Project: Connecting Algebraic Geometry to Phylogeny via SVD</p> |
| 2012 | <p>NSF REU in Computational Biology (summer)
 Department of Medical Physics, University of Wisconsin-Madison
 Student: Taurean Parker
 Project: The effect of scan length on the reliability of resting-state fMRI connectivity estimates (published)</p> |

ACADEMIC SERVICE AND LEADERSHIP

Climate, Diversity, and Inclusion

- | | |
|---------|--|
| 2017–18 | <p>Women Empowered in STEM Conference Organizing Committee
 College of Engineering, University of Illinois at Urbana-Champaign</p> |
| 2016–17 | <p>Society of Women Engineers Graduate Student Organizing Committee
 College of Engineering, University of Illinois at Urbana-Champaign</p> |
| 2016–17 | <p>Member, Engineering Graduate Student Advisory Committee
 College of Engineering, University of Illinois at Urbana-Champaign</p> |
| 2015–16 | <p>Chair, Engineering Graduate Student Advisory Committee
 College of Engineering, University of Illinois at Urbana-Champaign</p> |
| 2014–15 | <p>Secretary, Engineering Graduate Student Advisory Committee
 College of Engineering, University of Illinois at Urbana-Champaign</p> |

Seminar Organizing

- | | |
|------|---|
| 2018 | <p>Seminar Coordinator (fall)
 Institute for Pure and Applied Mathematics, Los Angeles (CA, USA)</p> |
|------|---|

Journal / Conference Reviewing (Ad Hoc)

- | | |
|------|--|
| 2018 | <p>RECOMB 2019, Systematic Biology</p> |
|------|--|

PROFESSIONAL MEMBERSHIPS

- | | |
|-------|---|
| 2019– | <p>International Society for Computational Biology (ISCB)</p> |
| 2018– | <p>Association for Computing Machinery (ACM)</p> |
| 2016– | <p>Society of Systematic Biologists (SSB)</p> |
| 2014– | <p>Society of Women Engineers (SWE)</p> |
| 2014– | <p>Society for Industrial and Applied Mathematics (SIAM)</p> |