

Jakob O. Nalley, PhD

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SUMMARY

- Adept science communicator with 7+ years of experience disseminating science across all levels of scientific literacy (K-12, lay, academic and industry)
- Versatile team member who has successfully led projects ranging from academic (inter- and intradepartmental collaborations), private sector (craft brewery partnership), and nonprofits (K-12 STEM Algae Initiative)
- Self-directed and innovative biologist with research experience in cellular biology and biochemistry, with expertise in algal biology, ecology, and phycoremediation.

EDUCATION

Michigan State University,

Ph.D., Department of Integrative Biology Nov. 2016

Dissertation Title: Optimizing the productivity and sustainability of algal biofuel systems: the benefits of algal diversity and utilizing brewery wastewater for cultivation.

Dual Ph.D.: Ecology, Evolutionary Biology and Behavior (EEBB)

Loyola University - Chicago,

B.S., Biology and Environmental Science, Summa cum Laude, 2011.

Minor in Bioethics

Senior Thesis Title: Retinoic Acid as a Node in a Developmental Pathway Influenced by Teratogen Exposure in Zebrafish, Advisor: Dr. F. Bryan Pickett

PUBLICATIONS

*Nalley, Jakob O., Stockenreiter, M. and E Litchman. "Community ecology of algal biofuels: complementary and trait-based approaches." *Industrial Biotechnology* (2014)

Nalley, Jakob O., Miller, E, S Schultz^ and E. Litchman. "The performance of algal biofuel monocultures and polycultures under fluctuating light." (Submitted/Under Review, *Applied Ecology*)

Nalley, Jakob O., J. Pino^ and E Litchman, "Coupling algal biofuel generation and brewery wastewater remediation: A study of species and nutrient diversity." (Intended journal – *Algal Research*)

Nalley, Jakob O., T. Cannis and Ira Levine, "Promoting the Power of Algae in K-12 Classrooms: An Algae Foundation Initiative." (International Society of Applied Phycology, 2016)

Nalley, Jakob O., D. O'Donnel and E. Litchman. "Growth rates and lipid content of diverse freshwater algae under different temperatures" (Submitted, *Oecologia*)

Nalley, Jakob O., K. McCullen^ and E. Litchman. "Optimizing brewery wastewater remediation and algal biofuel generation: A two-stage approach" (In preparation)

*Denotes an invited paper

^Denotes undergraduate mentee

RESEARCH EXPERIENCE

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| Dissertation Research | Coupling algal biofuel production and brewery wastewater remediation: An economic and sustainable option for the future of renewable energy and beer production. The performance of algal biofuel monocultures and polycultures under fluctuating light and temperature. |
| Plant Science Fellow | Optimizing algal biofuel generation: Constructing an efficient, profitable algae community. |
| Mulcahy Scholar 2010-2011 | Population-level implications of raised brooding temperatures on Zebrafish (<i>Danio rerio</i>). Dr. F. Bryan Pickett - Loyola University-Chicago |
| Undergraduate Lead Researcher 2011 | Community-support and sustainability assessment of a circulating community shuttle in neighborhoods of Chicago. Dr. Chad White - Loyola University-Chicago |
| Biology Research Fellow Summer 2010 | Environmental insults on embryogenesis and fitness consequences. Dr. F. Bryan Pickett - Loyola University-Chicago |
| Undergraduate Researcher 2008-2010 | Ontogenetic effects of ethanol and temperature exposure on Zebrafish (<i>Danio rerio</i>). Dr. F. Bryan Pickett - Loyola University - Chicago |

TEACHING EXPERIENCE

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| Curriculum Development | Algae Foundation – San Diego, CA – Co-chair for curriculum development, kit sourcing, fundraising (\$20k+) and outreach efforts |
| Teaching Assistant | Genetics (ZOL 341 – 3 Credits) Lecture/Online Course – Michigan State University Summer 2016 |
| K-12 Graduate Fellow | Kellogg Biological Station – Michigan State University – 12 Western-Michigan School District Partners (K-12 STEM Outreach) - 2015-2016 |
| Teaching Assistant | Algal Biology (PLB 424 – 4 Credits) Lecture, Field, and Lab Course – Kellogg Biological Station Summer 2015 |
| NSF GK-12 Fellow | Kellogg Biological Station - Michigan State University, High School AP Environmental Science, Cell Biology, Genetics – 2013-2014 |
| High School Mentor | Olivet High School Independent Research Projects – Spring 2013 |
| NSF GK-12 Fellow | Kellogg Biological Station - Michigan State University, 8 th Grade Earth Science 2012-2013 |
| Environmental Educator | Lake Forest Open Lands Association. 3 rd -7 th Grade Sessions |
| Teaching Assistant | Environmental Sustainability, ESP 390, LUC. 2011 |
| Academic Tutor | Loyola University-Chicago. Tutored Biology, Chemistry (Inorganic and Organic) and Physics. Hosted Large Group Biology Sessions. 2009-2011 |

MENTORING EXPERIENCE

- 2016 **High School Student Bowen Jiang (Mira Loma High School)** – *The Algae Foundation K-12 STEM Project*
- URA Katie McCullen (Michigan State Univ.)** – Kellogg Biological Station – *Optimizing algal biofuel production in brewery wastewater through functionally diverse polycultures.*
- 2015 **High School Student Yarielis Rosario (Battle Creek Area Math and Science Center)** – BCAMSC – *Targeted algae effect on water quality: Model Filter Experiment*
- High School Student Brenner Beck (Battle Creek Area Math and Science Center)** – BCAMSC – *Targeted algae effect on water quality: Model Filter Experiment*
- REU Jacob Pino (New Mexico State Univ.)** – Kellogg Biological Station – *Assessing the bioremediation potential of microalgae polycultures for brewery wastewater.*
- URA Scott Schultz (Michigan State Univ.)** – Kellogg Biological Station – *Optimizing algal biofuel production under fluctuating light conditions through functionally diverse polycultures.*
- 2014 **REU Farhana Haque (UT Austin)**– Kellogg Biological Station – *Eco-evolutionary response of algae cell-size under temperature stress.*”

PROFESSIONAL PRESENTATIONS

- 2016 **Keynote Speaker** – Michigan Alliance for Environmental and Outdoor Education – *Well-Oiled, Green Cleaning Machines: Coupling algal cultivation and brewery wastewater remediation*
- Invited Speaker** – Kellogg Manor House Seasonal Series – Oktoberfest Dinner
- 2015 **Invited Speaker** – Kalamazoo Valley Museum Sunday Series “Tapping into Brewery Wastewater to Generate Biofuels”
- Speaker and Panelist** – Algal Biomass Summit 2015 Biology Track “Algal Polyculture: Future of Open Pond Cultivation” - *Utilizing algal traits to assemble productive algal communities under fluctuating environmental conditions.*
- Guest Lecturer** – Kellogg Biological Station – *Biomass, Biofuels and Bioremediation – Exploring the many application of microalgae to meet the demands of a developing society.*
- KBS Brown Bag** – Kellogg Biological Station – *Pushing algae to their thermal limits. A trait collecting survey to inform productive community assemblages.*
- 2014 **KBS Brown Bag** – Kellogg Biological Station – *Biodiesel from Algae: Benefits of promoting algal diversity for fuel production.*
- 2013 **Honors Ecology Invited Speaker** – Michigan State University – *Designing profitable algal biofuel ponds: Ecological applications to a global problem.*
- Algal Biomass, Biofuels and Bioproducts** – Sheraton Centre, Toronto, Canada - *The performance of algal biofuel monocultures and polycultures under fluctuating light.*
 J.O. Nalley*, E. Miller, E. Litchman

Plant Science Graduate Research Symposium (PSGRS) –Michigan State University –
The performance of algal biofuel monocultures and polycultures under fluctuating light.
J.O. Nalley*, E. Miller, E. Litchman

KBS Brown Bag – Kellogg Biological Station – *The performance of algal biofuel monocultures and polycultures under fluctuating light.* J.O. Nalley*, E. Miller, E. Litchman

2011 **Loyola Undergraduate Research Opportunities Program (LUROP)** - *Retinoic Acid as a Node in a Developmental Pathway Influenced by Teratogen Exposure in Zebrafish.* J.O. Nalley*

Edgewater and Roger's Park Earth Day Event - *Feasibility and Implementation of a Community Supported Circulating Shuttle.* C.D. White, J.O. Nalley

2010 **Mulcahy Scholar Research Symposium** - *Retinoic Acid as a Node in a Developmental Pathway Influenced by Teratogen Exposure in Zebrafish* (Expanded Findings). J.O. Nalley*, F. Bryan Pickett

Department of Biology Summer Research Fellows Symposium - *Retinoic Acid as a Node in a Developmental Pathway Influenced by Teratogen Exposure in Zebrafish* (Preliminary findings) J.O. Nalley*, F. Bryan Pickett

***Denotes first author**

FELLOWSHIPS & GRANTS

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| Spartan Innovations Venture Fellow | Michigan State Foundation, 2015-2016 |
| UIC Sustainability and Energy Fellow | University of Illinois Chicago, Summer 2015 |
| K-12 Partnership Fellowship | Michigan State University, 2015-2016 |
| Award of Excellence Fellowship | Michigan State University, Summer 2015 |
| Graduate School Research | Michigan State University, Summer 2015 |
| NSF GK-12 Fellowship | Michigan State University, 2013-2014 |
| NSF GK-12 Fellowship | Michigan State University, 2012-2013 |
| Plant Sciences Fellowship | Michigan State University, 2011-2012 |
| Mulcahy Scholar | Loyola University-Chicago, 2010-2011 |
| Biology Summer Research Fellow | Loyola University-Chicago, Summer 2010 |

AWARDS

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| G. H. Lauff Research Award | Kellogg Biological Station, May 2015 |
| Outstanding Achievement | NSF GK-12 Partnership 2012 and 2013 |
| Honorable Mention | NSF GRFP, May 2012 |
| Biological High Honors | Outstanding Biology Major, Loyola Univ., May 2011. |
| Undergraduate Outstanding Research | High Honor for Undergraduate Research, LUC May 2011 |
| Golden Key International Honor Society | Inducted November, 2009. |
| National Society of Collegiate Scholars | Inducted September 2009 |

PROFESSIONAL TRAINING

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| Leadership | Algae Foundation Board Member and K-12 Initiative Co-Chair Spring 2016-2018 |
| Entrepreneurship | Biofilm Eradication Technology for HVAC Systems – Spartan Innovations Fellowship, MSU Foundation Innovations Center (August 2015 – May 2016) |
| Urban Development | Digital Rebirth: Digital Manufacturing in Urban Environments - Summer Institute on Sustainability and Energy, University of Illinois Chicago (August 2015) |
| Science and Engineer | Brewery Wastewater Treatment Facility Introduction and Walkthrough - Bell's Brewery Galesberg, MI (May 11, 2015) |
| Science Education | 5 Keys to Promoting Diverse Students' Sense of Belonging in College – KBS, Diverse: Issues in Higher Education (March 31, 2015) |
| Science Mentoring | Research Mentor Training – Michigan State University Graduate School (March 27, 2015) |
| Science Education | Translating Your Teaching – Michigan State University Graduate School (February 12, 2015) |
| Science Education | Cultivating an Inclusive Classroom - Michigan State University Graduate School (January 22, 2015) |
| Science Education | Certification in College Teaching Institute – Michigan State University Graduate School (May 8-9, 2014) |
| Science Education | <i>How People Learn</i> Michigan State University Graduate School Workshop/Seminar (April 4, 2014) |
| H.S. Education Experience | Kalamazoo Math and Science Center - AP Biology and Environmental Science Independent Research Project Advisor (2013-2014 School Year) |
| M.S. Education Experience | Olivet Middle School – 8 th Grade Earth Science (2012-2013 School Year) |
| Environmental Education | Lake Forest Open Lands Summer Environmental Educator (2010-2011) |
| Water Systems | Illinois Environmental Protection Agency (IEPA) Water Bureau – Specifically Wastewater Management and Regulation - Governor's Environmental Corp (2009) |

Graduate Courses Taken

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| Spring 2016 | Environmental Science and Policy Capstone: Evaluating societal trust in science in light of the Flint water crisis |
| Fall 2015 | Topics in Microbial Ecology & Evolution - Measuring Stability and Resiliency |
| Spring 2014 | Introduction to Environmental Science and Public Policy |
| Fall 2013 | Pathways to Scientific Teaching |
| Summer 2013 | Algal Biology |
| Fall 2012 | Statistical Methods of Ecology and Evolution |

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| Summer 2012 | Structural Equation Modeling (Enhancing the Linkages of Mathematics and Ecology) Maximum Likelihood (Enhancing the Linkages of Mathematics and Ecology) |
| Spring 2012 | Advanced Statistics for Biologists Evolutionary Biology Effective Scientific Writing Seminar |
| Fall 2011 | Population and Community Ecology Meta-Analysis Seminar Limnological Techniques |