Grant Nickles PhD

Grants and Fellowships

UW-Madison Distinguished Research Fellowship *Fall 2025 – **Fall 2027***
The Wisconsin Research, Innovation and Scholarly Excellence Initiative
Awarded $250,000 to establish my own postdoctoral research program at UW-Madison under the mentorship of Gluck-Thaler and Coon labs.

Graduate Research Fellowship Program *Fall 2022 – Fall 2025*
National Science Foundation
One of the oldest and most prestigious national scientific fellowships in the USA. Was awarded as a 2nd year graduate student applicant. Provides three years of a $37,000 stipend, and $12,000 in education allowance.

Biotechnology Training Program *Fall 2021 – Summer 2022*
National Institute of General Medical Sciences
Competitive T32 fellowship available to pre-doctoral graduate students at UW-Madison. The training program funds stipends and tuition worth $45,000 annually.

Graduate Research Fellowship Program- Honorable Mention *Fall 2020*
National Science Foundation
Honorable mention for my undergraduate application to the GRFP.

Education

Ph.D. in Cellular and Molecular Biology *08/2020 – 05/2025*
University of Wisconsin-Madison | GPA: 4.0

Masters in Cellular and Molecular Biology *08/2020 – 06/2022*
University of Wisconsin-Madison | GPA: 4.0
- Master awarded on completion of PhD preliminary examinations

B.S. – Genetics *08/2016 – 05/2020*
Iowa State University of Science and Technology | GPA: 3.96 | Summa Cum Laude
College of Agriculture and Life Science
- **Minor:** Bioinformatics and Computational Biology

Research Experience

Postdoctoral Researcher *10/2025 – **Present***
University of Wisconsin-Madison | Madison, WI
Supervisors: Dr. Emile Gluck-Thaler, Dr. Joshua Coon, Dr. Marc Chevrette

Primary Project: Fungi and bacteria present the best opportunity to overcome the current antibiotic and chemical therapeutics crisis, as they have evolved a diverse natural pharmacopeia whose potential remains untapped. My research plan is the first attempt to integrate genomic, proteomic, and metabolomic datasets into a unified framework for natural product discovery. If successful, this work will create the first AI-driven platform capable of computationally linking natural product genes to the chemicals they produce. This represents a transformative new approach to addressing the antibiotic innovation crisis through targeted drug discovery.

Graduate Student Researcher *08/2020 – 08/2025*

University of Wisconsin-Madison | Madison, WI

Supervisors: Dr. Nancy Keller and Dr. Milton Drott

Primary Project: I study secondary metabolites, or natural products, that are produced in filamentous fungi. I'm specifically interested in characterizing and understanding non-canonical clusters, which could unlock new classes of compounds for ecology studies and drug discovery. More specifically, my work is focused on developing novel genome mining pipelines to locate a previously undetectable class of fungal natural products from genomic sequences. This work has allowed me to gain skills in database management, website development, software development (python, R, and bash), in addition to core genomic techniques such as protoplasting, fungal transformations, DNA extractions and CRISPR.

International Research Experiences for Students (IRES)- South Africa *11/2022 – 12/2022*

National Science Foundation | South Africa

Supervisors: Dr. Jason Hoeksema and Dr. Anne Pringle

Primary Project: For this competitive month-long scientific workshop, I conducted field work in conjunction with regional timber companies to investigate the co-invasion of European pine with European mycorrhizal fungi. From this experience I learned the principles of field sampling and genomic sequencing/annotation in addition to gaining exposure to forest management and invasives species mitigation.

Undergraduate Research Assistant *08/2018 – 05/2020*

The Center for Biorenewable Chemicals (CBiRC) | Ames, IA

Supervisor: Dr. Marna Yandeau-Nelson

Primary Project: Our primary research goal was to address how the fatty acid biosynthetic pathway in *S. cerevisiae* could be harnessed to produce a variety of precursors for the emerging biorenewable chemical industry. Notably, I devised and optimized a high-throughput spectrometer-based

protocol that enabled me to screen hundreds of yeasts for enhanced fatty acid accumulation.

Biological Sciences Intern *05/2019 – 08/2019*

Apeel Sciences | Santa Barbara, CA

Supervisor: Savannah Braden, M.S.

Primary Project: Summer internship at a food security California-based start-up. My internship goal was to develop a biomarker-based detection system that can flag fruits harboring latent fungal infections. Upon the completion of my work, I was awarded the prize for best internship presentation out of my cohort of 20+ interns.

Undergraduate Research Assistant *01/2017 – 12/2017*

Iowa State University | Ames, IA

Supervisor: Dr. Mohan Gupta

Primary Project: Our lab studied the genetic regulation of microtubule dynamics in baker's yeast. This research experience taught me research and scientific method fundamentals in addition to many commonly used molecular biology techniques.

Leadership and Mentoring Experience

Fungal Supergroup Coordinator *07/2021–07/2024*

University of Wisconsin-Madison | Madison, WI

Head coordinator for a 'pseudo-department' at UW-Madison encompassing over 150+ members and 20+ research groups. Was responsible for organizing and executing a large outreach campaign during the Summer of 2023 that resulted in a 50% increase in the number of Supergroup members. Founded an annual undergraduate poster symposium.

Peer Mentor: Genetic Major *08/2018–05/2020*

Iowa State University | Ames, IA

Co-ran an introductory course taught to all incoming Genetic majors at Iowa State. Here we would teach core concepts in genomics, provide tips for success at college, organize networking opportunities, and more.

Teaching Assistant *08/2019–12/2019*

Iowa State University | Ames, IA

Teaching assistant for a 300-level genomic course that focused on genomics in the context of agriculture and biotechnology. As a TA, I was responsible for holding out of class weekly study sessions that students could attend to get extra help on course material.

Publications *in chronological order*

Nickles, G.R., Vaiana, A., Park, S.C., Broz, K., Estes, H.P., Llewellyn, T., Drott, M.T., Keller, N.P., Singh, G. (2025) Reconstructing the Evolution of a Key Fungal Isocyanide Megasynthase Using Genomes of Lichenized Fungi. *Publication submitted to Current Biology and waiting comments from reviewers.,* 10.2139/ssrn.5371150

Nickles, G.R., Stokes, C.K., Narh, D.L., Lynn, K.M.T., Fuqua, S.R., Bryan, C., Allen, B.M., Bivins, C.P., Bok, J.W., Brewer, J.S., Buthelezi, S.T., Clark, J.P.R.M., Coon, K.L., Corby, LR., Coetzee, M.P.A., Dewing, C., Duong, T.A., Harris, M.A., Keller, N.P., Kopotsa, K., Lane, F.A., Nichols, H.L., Nieuwoudt, A., Nuñez, M.A., Medina Munoz, M.E., Park, S.C., Pham, N.Q., Ryan, K.T., Solís, M., Vilgalys, R., Wallace, J.M., Wang, Y.W., Wingfield, B. D., Wingfield, M.J., Worley, T.K., Zallek, T.A., Zamanian, M. Hoeksema, J.D., Drott, M.T., Pringle A. (2025) Equipped for success: Genomes and metabolomes of European *Amanita muscaria* are conserved in its novel South African range. *Publication submitted to New Phytologist, awaiting revisions*.

Seo, H.W., Wassano, N.S., Amir Rawa, M.S., **Nickles, G.R.**, Damasio, A., Keller, N.P. (2024) Timeline of Biosynthetic Gene Cluster Discovery in Aspergillus fumigatus: From Characterization to Future Perspectives. *Journal of Fungi* 10, no. 4: 266

Nickles,G.R., Oestereicher,B., Keller,N.P. and Drott,M.T. (2023) Mining for a new class of fungal natural products: the evolution, diversity, and distribution of isocyanide synthase biosynthetic gene clusters. *Nucleic Acids Res.*, 10.1093/nar/gkad573.

Caesar,L.K., Butun,F.A., Robey,M.T., Ayon,N.J., Gupta,R., Dainko,D., Bok,J.W., **Nickles,G.**,Stankey,R.J., Johnson,D., *et al.* (2023) Correlative metabologenomics of 110 fungi reveals metabolite–gene cluster pairs. *Nat Chem Biol*, 10.1038/s41589-023-01276-8.

Won,T.H., Bok,J.W., Nadig,N., Venkatesh,N., **Nickles,G.**, Greco,C., Lim,F.Y., González,J.B., Turgeon,B.G., Keller,N.P., *et al.* (2022) Copper starvation induces antimicrobial isocyanide integrated into two distinct biosynthetic pathways in fungi. *Nat Commun*, **13**, 4828.

Nickles,G.R., Ludwikoski,I., Bok,J.W. and Keller,N.P. (2021) Comprehensive Guide to Extracting and Expressing Fungal Secondary Metabolites with Aspergillus fumigatus as a Case Study. *Current Protocols*, **1**, 1–48.

Venkatesh,N., Koss,M.J., Greco,C., **Nickles,G.**, Wiemann,P. and Keller,N.P. (2021) Secreted Secondary Metabolites Reduce Bacterial Wilt Severity of Tomato in Bacterial – Fungal CoInfections. *Microoganisms*.

Presentations *in chronological order along with accolades if relevant*

Nickles G, Park SC, "Natural Products in Amanita Fungi: From Death Caps to Super Mario Mushrooms—Recent Advances in Amanita Natural Product Research."

- **Oral presentation**: *UW-Madison Department of Plant Pathology; March 2025; Madison, WI.*

Nickles G, "The Next Boom in Drug Discovery"

- **Oral presentation**: *Yahara Software Tech Talks; March 2025; Madison, WI*
- **Invited Speaker** for podcast detailing the promise and limitations of natural product drug discovery

Nickles G, "How do Fungi (and other microbes) interact with the world?

- **Oral presentation**: *BioForward 2024 Conference; October 2024; Madison, WI*
- **Accolades:** Awarded 2nd place in state-wide student 3-min thesis competition

Nickles G, Wassano NS, Park SC, Rawa MS, Drott MT, Keller NP. "Unearthing Nature's Hidden Arsenal: Mining Fungal Genomes for a New Class of Medicine and Beyond"

- **Oral presentation**: *Fungal Genetics Conference #24; March 2024; Monterey, CA.*
- **Invited Speaker** in the concurrent session "Genetic regulation of primary and secondary metabolites"

Nickles G, Drott MT, Keller NP. "Unearthing Nature's Hidden Arsenal: Mining Fungal Genomes for a New Class of Medicine and Beyond"

- **Oral presentation**: *UW-Madison Department of Medical Microbiology and Immunology; August 2023; Madison, WI.*

Nickles G, Drott MT, Keller NP. "Mining for a New Class of Fungal Natural Products: The Evolution, Diversity, and Distribution of Isocyanide Synthase Biosynthetic Gene Clusters"

- **Poster presentation**: *Perlman Symposium; May 2023; Madison, WI.*

Nickles G, Nischala Nadig, Park SC, Drott MT, Keller NP. "Mining for a new class of metal associated fungal natural products: A case study into the biosynthesis of the antimicrobial isocyanide, brassicicolin A, in *Alternaria Brassicicola*."

- **Oral presentation**: *UW-Madison Department of Plant Pathology; April 2023; Madison, WI.*

Nickles G, Drott MT, Keller NP. "Computational advances in discovery of a new class of fungal natural products."

- **Oral presentation**: *UW-Madison Fungal Supergroup; Oct 2022; Madison, WI.*

Nickles G, Drott MT, Keller NP. "Computational advances in discovery of a new class of fungal natural products."

- **Poster presentation**: *Perlman Symposium; May 2022; Madison, WI.*
- **Accolades**: Awarded 1st place in student poster competition out of 40+ poster presenters. Awarded $200.

Nickles G, Drott MT, Keller NP. "Computational advances in discovery of a new class of fungal natural products."

- **Poster presentation**: *Fungal Genetics Conference; March 2022; Pacific Grove, CA.*

Wang W, **Nickles G***, Drott M, Caesar LK, Wang PM, Keller NP. "Transcription Factor Repurposing Offers Insights into Evolution of Biosynthetic Gene Cluster Regulation."

- **Poster presentation**: *Fungal Genetics Conference; March 2022; Pacific Grove, CA.*

Nickles G, Braden S. "Using molecular biology to let fruit tell us when it has fungal infections."

- **Oral presentation**: *Apeel Sciences Intern Symposium; August 2019; Santa Barbara, CA.*
- **Accolades**: Winner of crowd favorite presentation out of 10+ interns in companywide presentation.

Relevant Skills

- Fluent in Python, R, Bash and Git
- Proficient in Java
- Bioinformatics software development
- Genome mining for natural products
- CRISPR vector construction and use in transformations
- Experience working with protein structure models and AlphaFold database
- Working knowledge creating dynamic websites and HTML development
- Analytical Chemistry: LCMS and HPLC
- Microbiology
- Working with large interdisciplinary teams
- International collaboration experience
- Growing and establishing standard operating procedures for a 200+ person organization
- Developing computational software to streamline routine tasks
- Commitment to reproducible and open source science