

Grant Nickles M.S.



Grants and Fellowships

Graduate Research Fellowship Program

Fall 2022–Fall 2026

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

Graduate Student Researcher

08/2020 – Present

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 Yandau-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

Apel 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.**, 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, L.R., Coetze, 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 metabogenomics 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.**, Ludwiko, 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. *Microorganisms*.

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 ML model training 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](#)