Isabel Smalley

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RESEARCH INTERESTS

Plant Evolution, Plant Genomics, Genomic Data Modeling, Bioinformatics, Complex Genomics, Evolution of Reproductive Mode

EDUCATION

University of Minnesota Duluth **Bachelor of Science and Art, 2025**

Majors: Biology and Computer Science

Relevant Coursework: Eukaryotic Genomic Analysis, Genetics, Cell Biology, Artificial Intelligence, Software Engineering, Quantitative Analysis

Alexandria Technical and Community College **Associates of Liberal Arts, 2020**

RESEARCH EXPERIENCE

University of Minnesota Duluth **Duluth, MN**

Research Assistant (PI: Dr. Amanda Grusz) **April 2022-Present**

- Participated in five separate research projects across various plant species.
- Extracted DNA from 96 plant specimens across the land plant phylogeny.
- Collected and analyzed spores from more than 100 Smithsonian herbarium specimens to find drought relation to spore size.

Boyce Thompson Institute **Ithaca, NY**

Summer Intern (PI: Dr. Fay-Wei Li) **June-August 2023**

- Cultured and sampled hornwort species of 5 different genera for DNA and RNA extraction to identify genes responsible for switch from monoicy to dioicy.
- Leveraged UNIX and Python to examine genomic data and identified 3 hornwort species sex chromosomes from the data.
- Presented sex chromosome findings to a symposium of peers and experts in the field.

OTHER EXPERIENCE

Olga Lakela Herbarium, University of Minnesota, *Student Worker* **April 2022-May 2023**

- Digitize and file hundreds of herbarium specimens.
- Collaborate with faculty to digitize and process data.
- Understand metadata basics and its utility in herbariums.

Biology Department, University of Minnesota, *Teaching Assistant* **January-May 2023**

- Assisted with teaching Trees of Life: Assembly and Applications
- Helped students learn R.
- Held office hours to better help students learn to code.

PUBLICATIONS

Schafran, P., Hauser, D., Nelson, J., Xu, X., Mueller,L., Kulshrestha,S., **Smalley, I.,** de Vries, S., Irisarri, I., de Vries, J., Davies, K., Villarreal, J.C., Li, F.W. 2024. Pan-phylum genomes of hornworts revealed conserved autosomes but dynamic accessory and sex chromosomes. Nature Plants. (In submission)

CONFERENCE PRESENTATIONS

- **Smalley I**, Grusz A, and Windham M. Herbarium specimens expose cryptic diversity in *Myriopteris* (Pteridaceae). Botany Annual Meeting, Grand Rapids, MI, June 2024 (Poster)

- **Smalley I**, Schafran P, and Li FW. Examining Patterns of Dioicy Across Hornwort Phylogeny Using U/V Sex Chromosomes. Botany Annual Meeting, Grand Rapids, MI, June 2024 (Poster)

HONORS AND AWARDS

- American Society of Plant Taxonomists Undergraduate Research Award, **American Society of Plant Taxonomists**, 2024

- Botanical Society of America Undergraduate Research Award, **Botanical Society of America**, 2024

- Biology Undergraduate Research in Science and Technology, **University of Minnesota Duluth**, 2024

- Research Experience for Undergraduates, National Science Foundation, **Boyce Thompson Institute**, 2023

SKILLS

Technology: C++, Unix, Java, JavaScript, JavaFX, CSS, HTML, Assembly, Python, R, RStudio, Basic AI Algorithms, Microsoft Office Suite, Google Office Suite, Android Studio, Flutter, Dart, Python

Laboratory: PCR, Gel Electrophoresis, CTAB Extraction, Nanodrop, Differential Expression, Microscopy, Illumina Sequencing, GoFlag Sequencing, Nanopore Sequencing, Culturing

REFERENCES

Dr. Amanda Grusz
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Dr. Peter Schafran
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Dr. Paul Bates
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