

Bioinformatics in Plant Sciences: A model for training the next generation of data-enabled/fluent scientists

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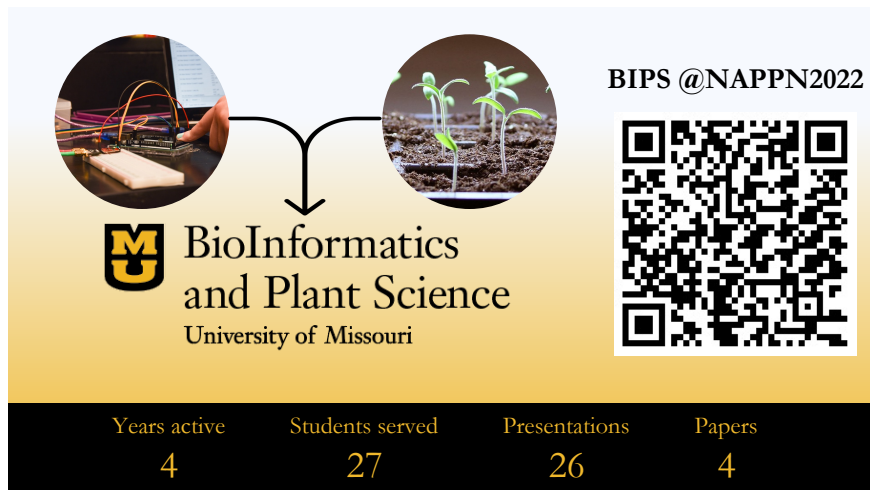
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Abstract

Generating data has become cheaper and easier, but alone is not sufficient to answer biological questions – data must be analyzed and interpreted. However, many algorithms can create or exacerbate biases (e.g., facial-recognition, ancestry, and disease risk). This necessitates incorporating diverse perspectives to confront both the moral and technical “big data challenges”. To move to a future where this is possible, it is necessary for researchers to develop skills in data management, processing, and analytics. Specifically, the field of plant phenotyping has moved from time consuming hand measurements to the use and development of high-throughput phenotyping. These systems require data-enabled/fluent users, yet academic programs in biology do not provide sufficient data science training. Here we present the Bioinformatics in Plant Science (BIPS) program at the University of Missouri (MU) as a model for training the next generation of data-enabled/fluent scientists. BIPS aims to mentor undergraduate students to build foundational skills in plant biology, research, and computational science. Our program pairs biology and computer science students to address biological questions through computational methods, with many focusing on plant phenotyping methods. The students learn to tackle problems using multidisciplinary approaches, alongside learning how to work in teams while building science communication skills (e.g., professional conferences, research forums, presenting to lawmakers). Through peer learning, BIPS students can understand and incorporate diverse perspectives from both the biological and computational side to address one of NSF’s 10 big ideas: harnessing the data revolution.



The poster features a central graphic with two circular images: on the left, a person's hands are shown working with a breadboard and electronic components; on the right, a small green seedling is growing in a pot. A black arrow points from the space between these two images down to the MU logo. To the right of the MU logo, the text "BioInformatics and Plant Science" is displayed in a large, bold font, with "University of Missouri" in a smaller font below it. Further to the right, the text "BIPS @NAPPN2022" is written above a large QR code. At the bottom of the poster, a black horizontal bar contains four white text elements: "Years active" with the number "4", "Students served" with the number "27", "Presentations" with the number "26", and "Papers" with the number "4".

BIPS @NAPPN2022

MU BioInformatics and Plant Science
University of Missouri

Years active	Students served	Presentations	Papers
4	27	26	4

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