

## Are You Fluent in Data? Enabling New Research With Data Literacy

Office of Research, Discovery and Innovation  
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A group of UA researchers is leading a grassroots effort to provide skills training designed to increase data literacy among researchers.

From sports scores to political polls to weather forecasts, facts and figures inundate us every day. But how well do we know how to interpret, ask questions of, and gain meaning from that flood of information? For many of us, the answer is not very well.

For researchers, that flood of information often turns out to be a deluge of data that, given the right tools, can lead to exciting new questions, yield powerful insights and reveal new ways of looking at old ideas. Yet many researchers with deep, domain-specific expertise aren't aware of the predictive analytics, classification and visualization tools available, or they aren't fluent enough in the language of data science to wield them.

A group of data-fluent UA researchers is determined to change that.

**Jeffrey Oliver**, data science specialist in the Office of Digital Innovation and Stewardship at University Libraries, says the group is committed to using the power of computer processing units and "human processing units" to increase data literacy across campus. The group's members plan to do that by leveraging the [Data Science Institute](#) <sup>[1]</sup>, known as Data7, [CyVerse](#) <sup>[2]</sup>, the [research computing](#) <sup>[3]</sup> team at University Information Technology Services and the [Data Science Ambassadors](#) <sup>[4]</sup>.

Working alongside Oliver are others instrumental in the effort to expand data literacy at the UA, including **Nirav Merchant**, director of Data7; **Susan Miller**, deputy director at Data7; **Vignesh Subbian** in the College of Engineering and the BIO5 Institute; and **Eric Lyons**, **Fiona McCarthy** and **Kathleen Prudic** from the College of Agriculture and Life Sciences.

"From the arts to the sciences and engineering, data science is quantitatively and qualitatively transforming research," Subbian said. "However, it is upon us to increase capacity among our students and faculty and help them to take advantage of the expanding landscape of data science tools."

To tackle the literacy gap, Oliver, Subbian and the others are employing several skill-focused programs, such as workshops offering specific hands-on training. In academic settings, those seeking to develop data science skills generally have two options: a multiyear degree or certificate program, or "just-in-time" workshops that offer training at the time researchers need the skills to advance their work. The workshops are especially useful for domain-area experts to get the skills they need when they need them.

The Data Science Ambassadors program, launched last year, represents another unique avenue through which domain-area experts are able to acquire data science skills. The charge for the ambassadors – doctoral students selected for their advanced data science skills and domain expertise – is to not only connect researchers in their colleges to the cyberinfrastructure, computational power and human expertise needed to exploit data science research tools, but also to be change agents in data science best practices.

Prior to beginning their service, the ambassadors complete an instructor training program sponsored by The Carpentries, a nonprofit organization that emphasizes small-scale and immediately applicable tools, and that teaches foundational coding and data science skills to researchers around the globe. Thus prepared, the ambassadors are in position to work within their departments to create a community of practice and bridge the data science skills gap.

The following colleges are home to members of the 2019 cohort of ambassadors:

### College of Agriculture and Life Sciences

W. Austin Rutherford

### College of Humanities

Drake Asberry

### Graduate College

Brian Bell

Adriana Picoral

### College of Social and Behavioral Sciences

Kelsey Gonzalez

Alexander Pakalniskis

## College of Science

Jennifer Kadowaki and Saren Seeley

## College of Education

Torbet McNeil

## College of Medicine – Tucson

Samir Rachid Zaim

Data science modules offered in the classroom by guest instructors – an ambassador, a postdoc or another faculty member – are another tool Oliver and his colleagues are using to enhance data science literacy for both faculty and students. Taking advantage of existing expertise and domain-tailored modules makes it easy for both professor and student to gain new skills.

Focusing on undergraduates, CALS researchers McCarthy and Prudic have developed a set of data competency skills students will need to be successful in their fields. But because it's not enough to know which skills are sought after by potential employers, McCarthy and Prudic are also reviewing the curricula to make sure the skills are included and taught in the classroom.

"Think of data literacy as a spectrum of related skills," Prudic said. "Students learn to read, work with, analyze and communicate with data. This toolbox empowers students to make better societies for all of us, like critical thinking on steroids."

McCarthy agrees and adds, "One of the key things we are trying to achieve is data literacy for all. While traditionally data analytics has been the purview of disciplines like maths and computer science, we all have data and all of our students need to have data management skills to be workplace-ready."

As novel approaches, new algorithms and innovations in computer science and statistics push the power and possibilities of data science forward, these experts are working together to help the UA leverage its many resources to continually advance cutting-edge scientific achievements.

"Ultimately our goal is to improve data science literacy at the UA by connecting the software, the hardware and the people – both data science experts and domain-area experts – into one community of practice, and then to build capacity on top of that," Oliver says.

"This goal is also directly aligned with the UA strategic plan, which seeks to equip our student community with skills and mindset to lead and thrive in the Fourth Industrial Revolution economy," Subbian adds.

If your college or department would like to get involved in the Data Science Ambassadors program, please contact the program directors at [datascience@email.arizona.edu](mailto:datascience@email.arizona.edu) [5]. The next call for nominations opens on March 1. More information and an FAQ is available [here](#) [6].

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### Links

[1] <https://datascience.arizona.edu/> [2] <https://datascience.arizona.edu/cyverse> [3] <https://it.arizona.edu/research/about-research-computing> [4] <https://datascience.arizona.edu/ambassadors> [5] <mailto:datascience@email.arizona.edu> [6] <https://datascience.arizona.edu/data-science-ambassadors-program>