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Short Courses: Flexible Learning Opportunities in Informatics

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Short Courses: Flexible Learning Opportunities in Informatics

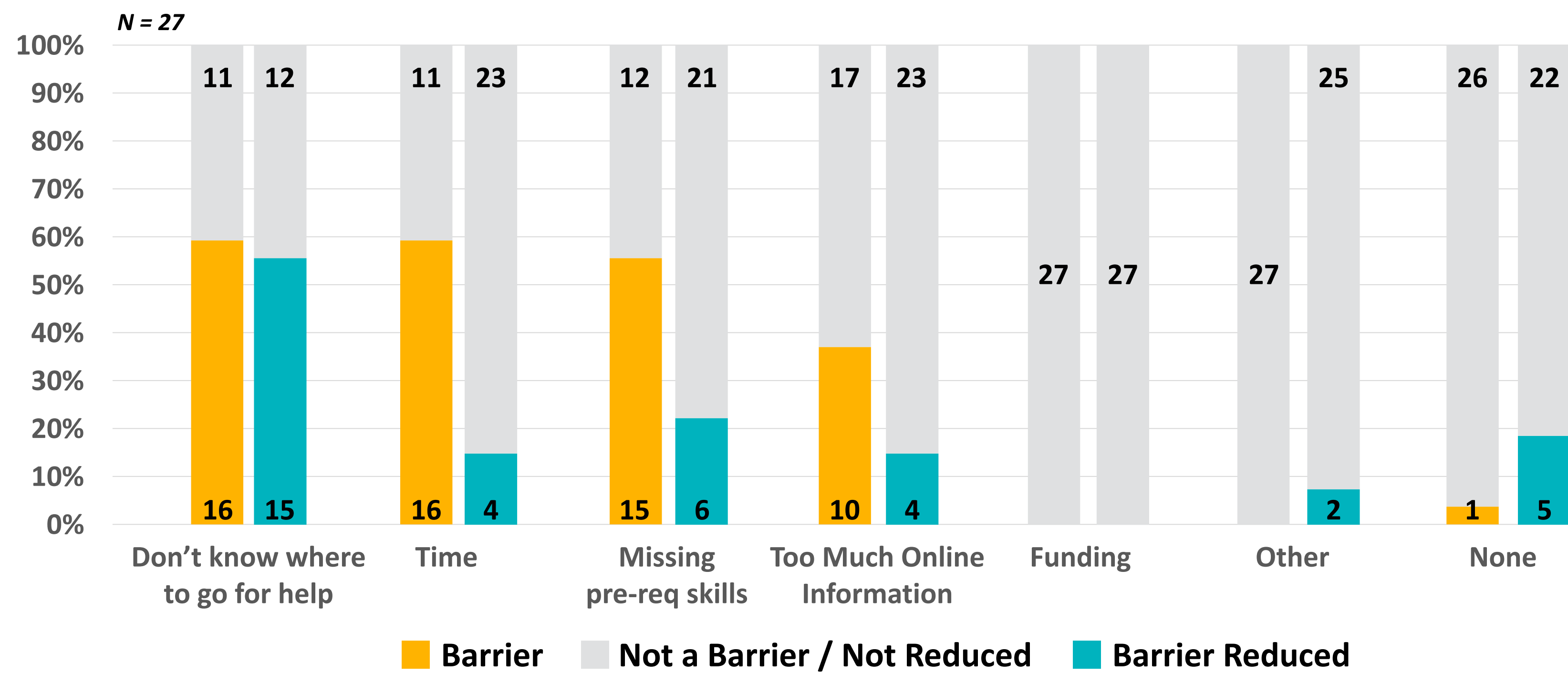
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Education in Informatics

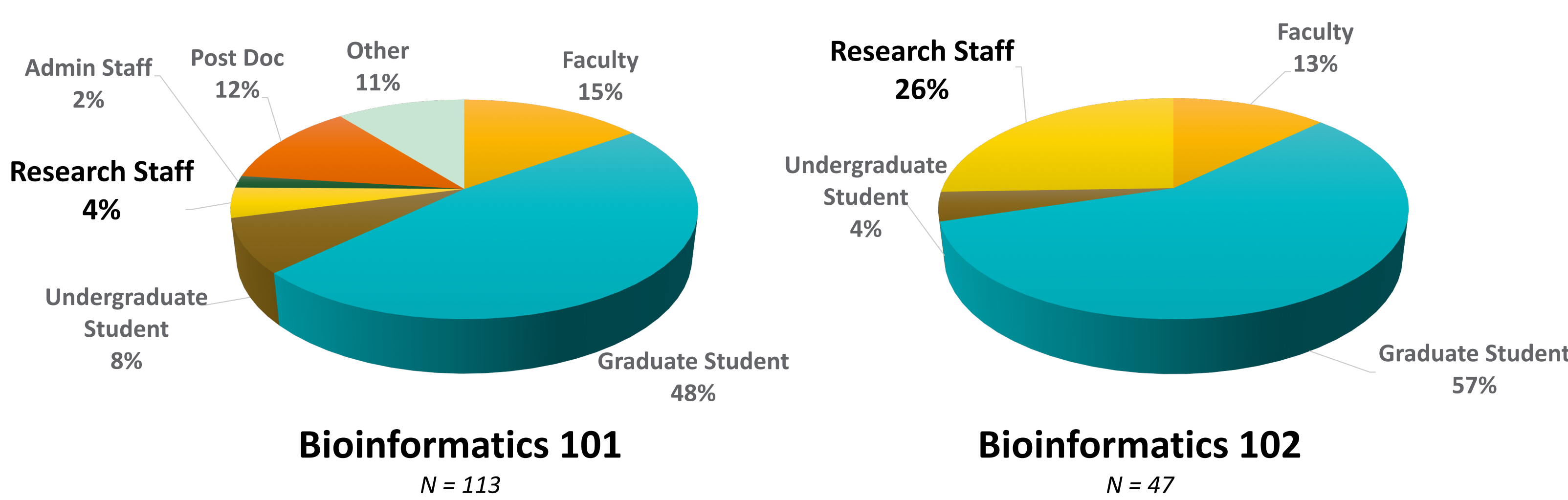
In today's fast-paced, data-driven world, researchers need to have a good foundation in informatics to store, organize, process, and analyze growing amounts of data. However, not all degree programs offer such training. Obtaining training in informatics on your own can be a daunting task for both new and established researchers who have little informatics experience. Providing educational opportunities appropriate for various skill levels and that mesh with a full-time schedule can remove barriers and foster a collaborative, informatics-savvy community that is better equipped to push science forward.

Barriers to Learning Bioinformatics

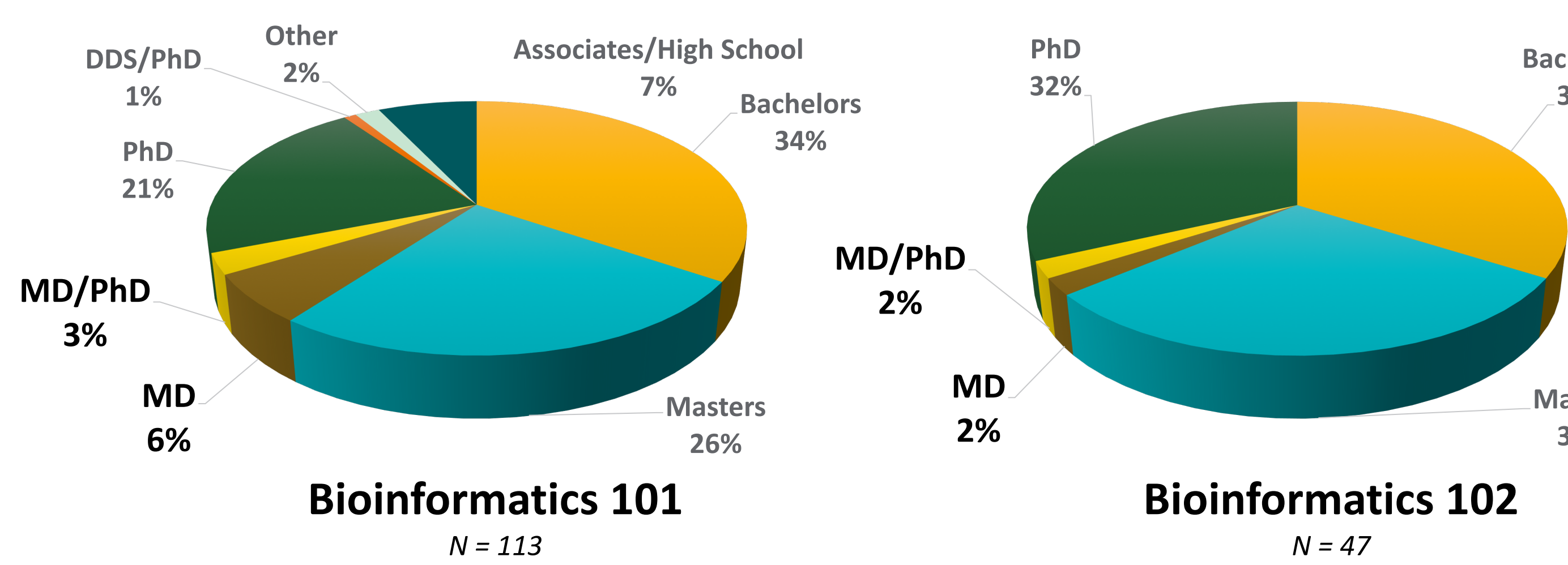


Reducing Barriers: A follow-up survey sent to 271 individuals who registered for Bioinformatics 101 or 102 reveals 4 main barriers to learning Bioinformatics: time, missing pre-req skills, too much online information, and not knowing where to go for help. Through the short courses, each of these barriers were reduced for some people; however, the largest reduction was for not knowing where to go for help, which indicates that after attending these short courses attendees are better acquainted with bioinformatics resources and services available to the VCU community.

Workshops Attract Higher % of Research Staff

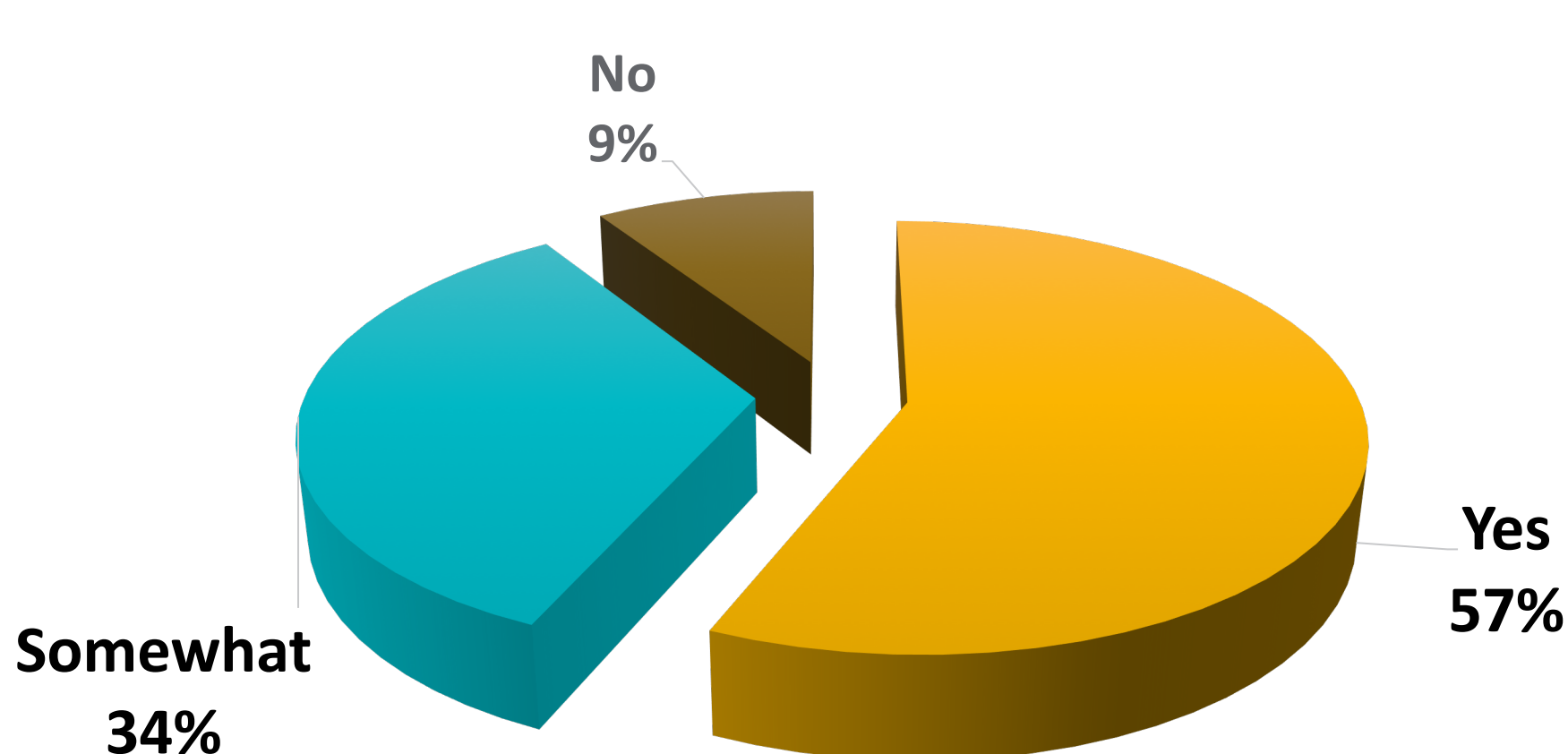


Seminars Attract Higher % of MDs

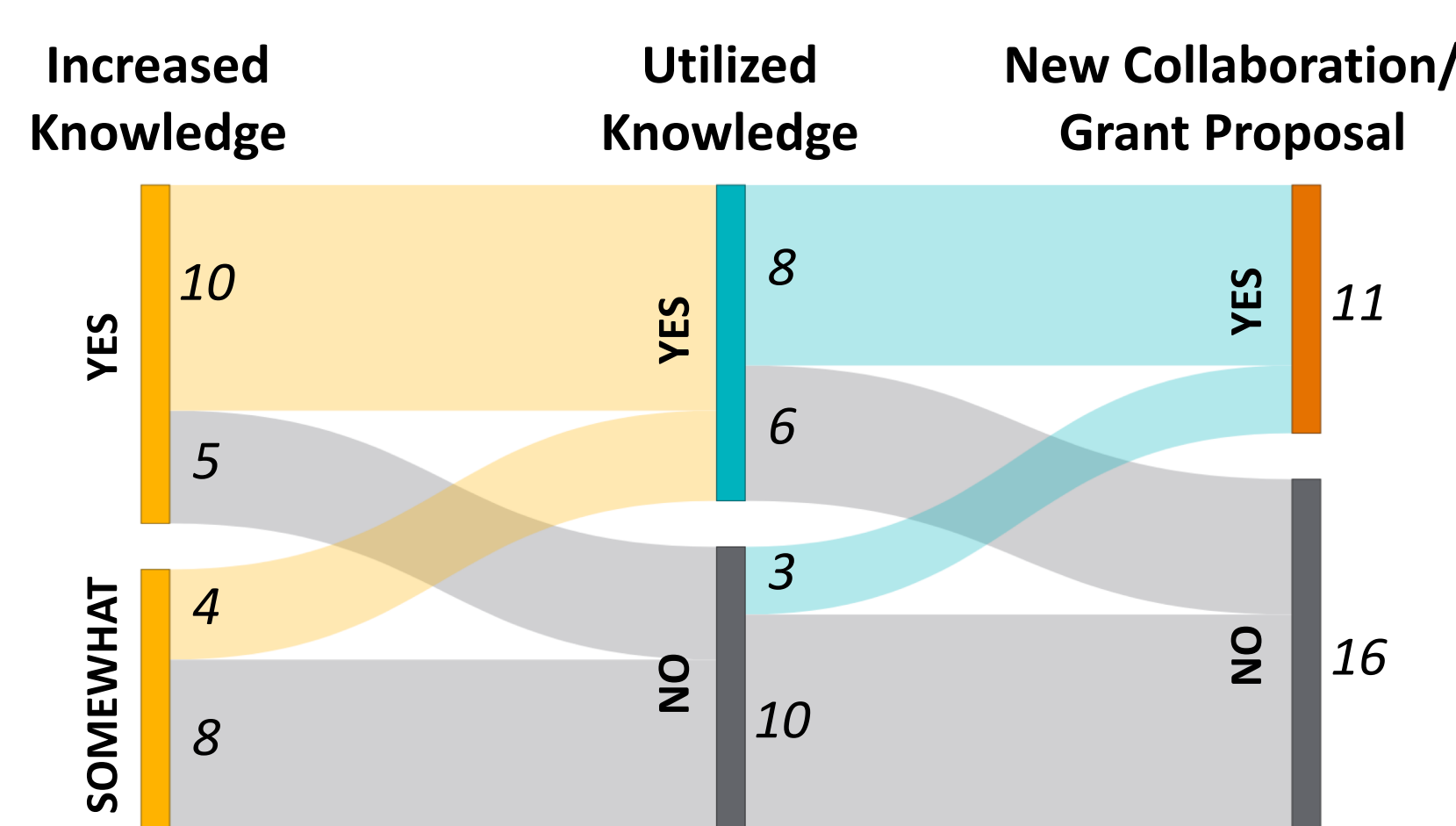


Changing Demographics: More research staff signed up for the workshops than the seminars, while the seminars attracted more medical doctors. These results show that different formats of education appeal to different audiences. Thus, it is important to keep your target audience in mind when designing educational material. *Note: Data are from 2016 and 2017 only. Bio101 data are from registration forms, and Bio102 data are from post-workshop surveys.*

Improved Knowledge and New Research Opportunities



Knowledge Improved: From all 3 years of Bioinformatics 101, 81% of responses indicate that knowledge was improved. For Bioinformatics 102, all attendees indicated that their knowledge was improved (not shown). *Note: 2015 Bio101 data and all Bio102 data was obtained from final surveys only. Data from Bio101 2016-17 was summed over weekly survey responses.*



New Opportunities: All Follow-Up Survey respondents (N=27) indicated that the courses increased their knowledge of Bioinformatics (choices were Yes, Somewhat, and No). About 50% of these have utilized this knowledge since, including writing NIH and NSF grant proposals, and/or forming new collaborations.

Short Course Descriptions

Bioinformatics 101 Seminar Series

Format: 8 weeks/1hr per week/broadcast live

Cost: Free

Topics:

- Bioinformatics and Precision Medicine
- Cancer Informatics
- High-Throughput Technology
- Sequencing Data Types and Public Data Repositories
- RNA-seq/DNA-seq/ChIP-seq Applications and Analyses
- Metagenomics Applications and Analyses
- Metabolomics and Lipidomics
- Functional and Pathway Enrichment Analysis

"...101 was extremely helpful by providing knowledge that I never had before...[and] provided [a] 'where to start'."

Bioinformatics 102 Genomics Databases Workshop

Format: 5 days/2hrs per day

Cost: Free

Topics:

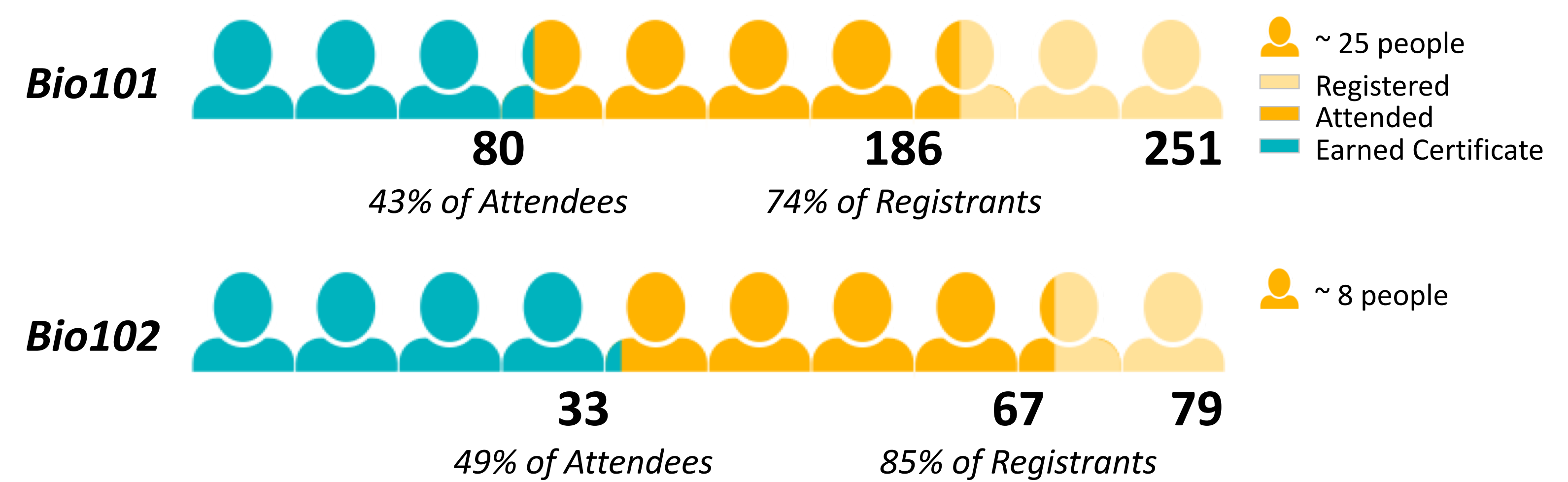
- NCBI Gene, BLAST, and Variation Viewer
- Gene Expression Omnibus
- NIH Genomic Data Commons (GDC)/The Cancer Genome Atlas (TCGA)

"...these workshops were a great initial jump into this domain."

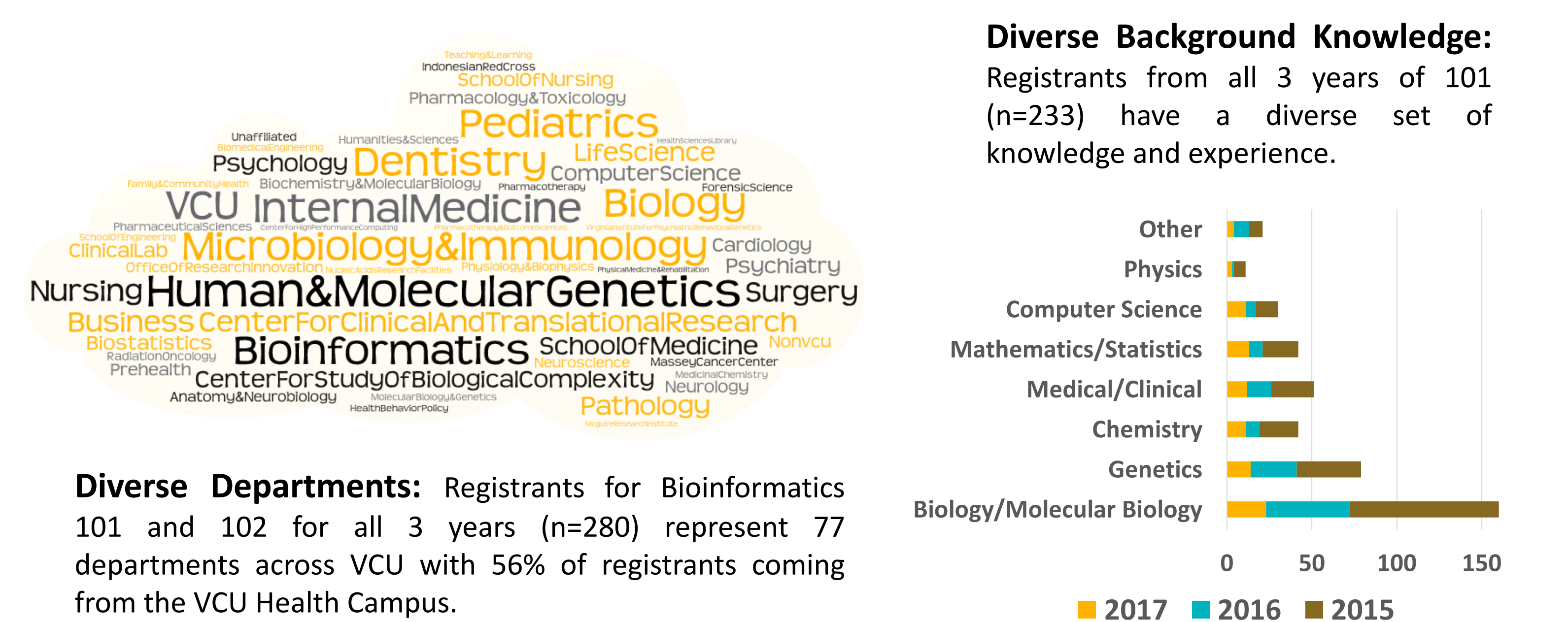
Certificate of Completion Requirements

- Attend at least 6 seminars/4 workshops.
- Score an average of 7 or above on all quizzes/labs.
- Complete exit survey (required for Bio102 only).

High Interest in Bioinformatics Courses



Course Material must be Approachable for a Diverse Group of Attendees



Conclusions and Future Work

The Bioinformatics Short Courses have been well received, highly anticipated each year, and have gained attention beyond VCU. The courses have done a great job of educating researchers about VCU resources and introducing attendees to Bioinformatics and NGS analysis; however, there are still improvements to make to reduce learning barriers such as time, pre-req skills, and overwhelming online information. To mitigate these barriers we aim to 1) start **recording and posting lessons online** for researchers to watch on their time, 2) **host Software Carpentry-inspired workshops** to provide basic pre-req skill training as well as provide **advanced workshops** so attendees can get help walking through actual pipelines, and 3) provide **online navigation resources** on various topics to help researchers navigate online material more efficiently.

Contact alolex@vcu.edu for more information.