

A Process for Distinctive Curricular Design for Liberal Arts Computing Programs*

Conference Tutorial

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The SIGCSE Committee on Computing Education in Liberal Arts Colleges (SIGCSE-LAC Committee) has found that liberal arts and small colleges approach design of their computing curricula in unique ways that are driven by institutional mission or departmental identity. This impacts how faculty at these colleges adopt curricular guidelines such as the current ACM/IEEE-CS

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CS2013¹. The committee is developing guidance, informed by its sessions at recent CCSC and SIGCSE conferences, to help with the design and/or revision of CS curricula in liberal arts contexts [1]. This will ultimately be included in the committee’s article in the Curricular Practices Volume that will be released as a companion to the new ACM/IEEE-CS/AAAI Computer Science Curricula guidelines (CS2023)². Curricular guidelines like CS2013 or CS2023 inform curriculum design but are balanced with the vision for a program, departmental strengths, locale, student populations and unique academic experiences. The desire to craft distinctive curricula, combined with the size of prior curricular recommendations, requires an assessment of trade-offs between achieving full coverage of curricular recommendations and a school’s other priorities. SIGCSE-LAC’s guidance will encourage faculty to reflect on their programs and the role of CS2023, beginning with their institutional and departmental priorities, opportunities and constraints.

The specific goal of this session is to introduce participants to SIGCSE-LAC’s guidance to consider curricular development in the context of the unique features of their programs and . Following an overview and brief discussion of CS2023, participants will begin working through the latest version of the committee’s reflective assessment process. This process is framed by a series of scaffolding questions that begin from institutional and departmental missions, identities, contexts, priorities, initiatives, opportunities, and constraints. From there, participants will be led to identify design principles for guiding their curricular choices including the CS2023 recommendations. Examples gathered from the committee’s previous CCSC and SIGCSE sessions will be available to help to articulate identity and program design principles, which will then be used for the identification of identity-focused program-level learning outcomes. A spreadsheet tool that is being developed to aid in the shaping of curricular choices will be demonstrated. Participants will leave the session with a better understanding of how CS2023 can impact their programs and a jumpstart on the entire reflective assessment process. Feedback on the process and this session are welcome and will be used to refine the committee’s guidance prior to its publication in the CS2023 Curricular Practices volume.

References

[1] Amanda Holland-Minkley, Jakob Barnard, Valerie Barr, Grant Braught, Janet Davis, David Reed, Karl Schmitt, Andrea Tartaro, and James D. Teresco. Computer science curriculum guidelines: A new liberal arts perspective. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1*, SIGCSE 2023, page 617–623, New York, NY, USA, 2023. ACM.

¹https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf

²<https://csed.acm.org>

Presenter Biographies

One of the eight co-authors of this session plans to serve as presenter.

Grant Braught is a Professor of Computer Science at Dickinson College. He is a facilitating member of the SIGCSE-LAC Committee, has organized committee events focused on curricula and has published widely on issues related to CS education, particularly within the liberal arts.

Other Author Biographies

Jakob Barnard is Chair and Assistant Professor of Computer Science & Technology at the University of Jamestown. He is a member of the SIGCSE-LAC Committee and his research involves how curricula has been integrated into Liberal Arts Technology programs. **Janet Davis** is Microsoft Chair and Professor of Computer Science at Whitman College, where she serves as the department's founding chair. She co-organized SIGCSE pre-symposium events in 2020 and 2021 on behalf of the SIGCSE-LAC Committee. **Amanda Holland-Minkley** is a Professor of Computing and Information Studies at Washington & Jefferson College. Her research explores novel applications of problem-based pedagogies to CS education at the course and curricular level. She is a facilitating member of the SIGCSE-LAC Committee. **David Reed** is a Professor of Computer Science and Chair of the Department of Computer Science, Design & Journalism at Creighton University. He has published widely in CS education, including the text *A Balanced Introduction to Computer Science*, and served on the CS2013 Computer Science Curricula Task Force. **Karl Schmitt** is Chair and Associate Professor of Computing and Data Analytics at Trinity Christian College. He has served on the ACM Data Science Task Force and various Computing, Technology, Mathematics Education related committees for the MAA, ASA and SIAM. His interests explore data science education, and interdisciplinary education between computing, mathematics, data, and other fields. **Andrea Tartaro** is an Associate Professor of Computer Science at Furman University. Her computer science education research focuses on the intersections and reciprocal contributions of computer science and the liberal arts, with a focus on broadening participation. She is a member of the SIGCSE-LAC Committee, and has published and presented in venues including the CCSC and the SIGCSE Technical Symposium. **Jim Teresco** is Chair and Professor of Computer Science at Siena College. He has been involved in CCSC Northeastern for 20 years and currently serves as board chair, and has been involved with the SIGCSE-LAC Committee for 4 years. His research involves map-based algorithm visualization.