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A data-driven approach towards instruction in an introductory programming class

Computer programming has become an essential skill in young people's trajectories for academic success in STEM, entry into STEM professions, and increasingly across a broader spectrum of career choices. Unfortunately, recruiting and retention of a diverse student body, particularly women and students from underrepresented populations, into computing and STEM careers remains a complex challenge involving broad differences in student preparation, cultures and needs.

I'll demonstrate some novel instructional strategies (and tools) to teach and learn C-programming. I'll also demonstrate our automated data collection and analysis platform which is at the core of our ongoing work in Educational Data Mining with the goal to better understand the individual pedagogical gateway barriers that prevent students from attaining proficiencies in computer programming. I'll finish by showing how this work has in turn uncovered hidden stumbling blocks for students and thereby informed a course re-design of my introductory programming course to improve student outcomes.