

SE DEPARTMENT SEMINAR

DEVELOPING ENGAGING CONCEPT-DRIVEN TOOLS AND STRATEGIES FOR TEACHING STRUCTURAL DESIGN



WITH GUEST SPEAKER

DR. JOEL LANNING, PHD, PE

NOVEMBER 3RD

SME 248

3:00 - 4:00 PM

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TEACHING OF CIVIL ENGINEERING
UNIVERSITY OF CALIFORNIA, IRVINE

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Structural Engineering

Abstract:

Structural engineering students are expected to have a well-developed understanding of structural design upon graduation. However, many students achieve only a low level of understanding and design abilities amounting to “plug-and-chug” and “being able with the table.” These student outcomes are simply not acceptable when it comes to designing structures that affect the lives of countless people. Rather, when students are able to learn fundamental design skills through solid conceptual understanding – like being able to follow the flow of forces – they will ultimately be better equipped to navigate more complex problems later on in their professional careers. In other words, undergraduates who can answer “why,” and not just (at best) “how,” should be better prepared for lifelong learning and growth in engineering.

In this talk, I will discuss my teaching style, philosophy, and some tools and techniques I have developed to deliver engaging courses that are taught with a heavy emphasis on the fundamental concepts in structural design. This includes a large set of hands-on interactive mini demos, as well as my use of a “light board” for live streaming lectures facilitating more natural remote instruction. I will also share the latest on a comprehensive set of interactive figures covering the core concepts in a first course on structural steel design. This project is funded by the American Institute of Steel Construction (AISC) and consists of 24 activities useable by instructors in class to help facilitate active learning, by students in “studying by playing,” or as customizable practice problem generators.

My teaching efforts are always student-centered, and I strongly believe in the role of active learning in the classroom. We all learn by doing, and hands-on experiential learning is a must in modern undergrad curricula; however, the trick is to strike the right balance with foundational theory. As ever more powerful analysis, design, and visualization tools continue to arise (e.g., XR and AI-powered design tools), students will increasingly rely on us to convince them of the value of understanding the fundamentals. Otherwise, the pressure of productivity together with seemingly magical tools will certainly end in students returning to a new possibly more dangerous version of “plug and chug.”

Biography:

Dr. Joel Lanning is currently an Assistant Professor of Teaching at the University of California, Irvine (UCI) and was previously an Assistant Professor at California State University, Fullerton. Each appointment was within the Department of Civil and Environmental Engineering (CEE). He earned his M.S. and Ph.D. (2014), here, at UC San Diego in Structural Engineering and his B.S. in Civil Engineering from The Ohio State University. As a first-generation college graduate, Joel is passionate about undergraduate education that equips students with practical skills and abilities in engineering rooted in strong fundamentals. Through this, he strives to empower his students to better society and to fuel their socioeconomic mobility by becoming successful professionals.

Professor Lanning has taught and developed courses and educational programs ranging from a hands-on high school engineering summer program (UC COSMOS) all the way through graduate-level courses in structural steel design and earthquake engineering. Joel is also the coordinator of the CEE Senior Capstone Design Program that engages 20 to 30 industry partners each year in delivering an intense two-quarter long internship-like experience to small groups of seniors. Additionally, he is the faculty advisor for ASCE UCI and the Steel Bridge, Concrete Canoe, and Timber Strong-Build student design competition teams.

Dr. Lanning was elected twice as Secretary of the Faculty of the Samueli School of Engineering (SSoE) at UCI and has recently received the SSoE Early Career Faculty Award in Teaching Innovation. Finally, Joel serves as the ABET Faculty Lead in CEE at UCI where he is focused on bettering the programs’ continuous improvement processes and works with faculty across disciplines on assessment and accreditation related issues.