

CENTER FOR DESIGN EDUCATION
HARVEY MUDD COLLEGE
CLAREMONT, CALIFORNIA, USA



"ENGINEERING DESIGN EDUCATION AND ARTIFICIAL INTELLIGENCE"

CLIVE L. DYM MUDD DESIGN WORKSHOP XIV

29-31 May, 2025

PROGRAM

Supported by Harvey Mudd College's Center for Design Education, this workshop brings together engineering educators, designers and researchers to articulate the relevant issues of process in engineering design education. The participants intend to identify and delineate the key intellectual and institutional issues that engineering design educators should address.

ORGANIZING COMMITTEE: R. Adams, Purdue University; A. Altman, United States Air Force Research Laboratory; R. Bailey, University of Virginia; S. Bedi, University of Waterloo; S. Bhattacharya, Boston College; S. Daly, University of Michigan; J. Henriques, Boston College; S. Howe, Smith College; A. Ibrahim, Yorkville University; G. G. Krauss (committee chair), Harvey Mudd College; M. Lande, South Dakota Mines; A. Mabogunje, Stanford University; W. Oakes, Purdue University; K. H. Sienko, University of Michigan; M. Siniawski, Loyola Marymount University; J. P. Terpenney, George Mason University; J. Turns, University of Washington; M. Wettergreen, Rice University; and M. C. Yang, Massachusetts Institute of Technology.

8:00 – 9:50 AM, THURSDAY (DESIGN STUDIO, PARSONS 1287)

OPENING BREAKFAST

Welcoming Remarks: Dr. Harriet Nembhard, President, Harvey Mudd College

10:00 – 11:50 AM, THURSDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 1

INNOVATING DESIGN WITH AI

Moderator: Sheri Sheppard

Speakers:

Kaela Martin, Brian Roth, How Can AI Help Design? Lessons Learned from Engineering Students and Faculty

Micah Lande, Artificial Intelligence is Your Newest Team Member Who Needs Training Wheels: Exploring the Opportunities and Challenges of Large Language Models in Generative Design Activities in the Engineering Classroom

Yakhoub Ndiaye, An Exploration of Reasoning Types within Generative AI for Engineering Design: A Framework

12:00 – 1:50 PM, THURSDAY (GREEN ROOM, PLATT CENTER)

FIRST DAY KEYNOTE LUNCHEON

Keynote Address: Andrew B. Williams, Dean of Engineering & Louis S. LeTellier Chair, The Citadel: *Designing Pathways Across the Artificial Intelligence Divide*

2:00 – 3:50 PM, THURSDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 2

AI IN DESIGN PEDAGOGY AND PRACTICE

Moderator: Arlindo Silva

Speakers:

Chris Rennick, Supplementing Novice Design Knowledge with Large Language Models

Corey Schimpf, Reframing AI in Education: Generating Design Requirements to Guide AI Agents Development to Support Front-End Design Learning

Reem Khojah, Evaluating In-Class Assignment for Graduate Students Using Bloom's Taxonomy-Based Pre and Post-Lecture Formative Assessments

John Clay and Russell C. Reid, Curriculum Development and Education Research for Generative Design Thinking

4:00 – 5:50 PM, THURSDAY (SKY CUBE, SHANAHAN 3460)

IDEAS MARKETPLACE

Gordon Krauss, Exploring AI Interventions in the Sustainability & Social Entrepreneurship Fellowship

Chris Rennick, The Case for Multiple, Regional, Design Workshops – The Canadian Design Workshop Experience

Filippo Chiarello, Leveraging AI for Personality-Based Team Optimization

Justin Klingenberg, Evaluating Role-Based AI Prompt Frameworks for Enhancing Individual Ideation in Engineering Design: A Pilot Study

6:00 PM, THURSDAY (SKY CUBE PATIO, SHANAHAN) RECEPTION

MUSIC BY CUCAMONGA COLLECTIVE

6:45 PM, THURSDAY (GREEN ROOM, PLATT CENTER)

INFORMAL DINNER & KEYNOTE

Keynote: Professor Filippo Chiarello, Head of Design Society Special Interest Group on AI in Design, University of Pisa: *AIXDESIGN: A Community Driven Literature Review Exercise*

Host: Gordon G. Krauss, *Harvey Mudd College*

7:00 – 7:50 AM, FRIDAY (DESIGN STUDIO, PARSONS 1287)

BREAKFAST

8:00 – 9:50 AM, FRIDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 3 ETHICS, EMPATHY, AND EQUITY IN AI-ENHANCED DESIGN

Moderator: Andrew B. Williams

Speakers:

Doug Yung, Ethical and Cultural Implications of AI in Engineering Design Education: Integrating Ethical Audits into the Design Process

Subinay Malhotra, Cultural and Semantic Barriers in Assistive Technology Design: Rethinking Adoption Through Empathy

Jan Auernhammer, The Socio-economic Dynamics of Design: Power, Privilege, and Poverty in Capital Formation

10:00 – 11:50 AM, FRIDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 4 AI TOOLS AND PLATFORMS FOR STUDENT LEARNING

Moderator: Filippo Chiarello

Speakers:

Cindy Atman & René Capella, AI-Supported Reflections on Design Signatures

Rea Lavi, Evaluating the Perceived Efficacy and Usability of an AI-enhanced Platform for Design Learning Management

Dorothy Missingham, Critical Thinking in a Generative AI Environment: Optimising Problem Solving (OPS) to promote higher order thinking and decision making skills among Engineering Systems Design students

Subinay Malhotra, Integrating Universal Design and Sustainability in Design Education: A New Pedagogical Paradigm

12:00 – 1:50 PM, FRIDAY (GREEN ROOM, PLATT CENTER)

SECOND DAY KEYNOTE LUNCHEON

Keynote Address: Professor Aditya Johri, Dr. Lawrence Cranberg Endowed Research Fellow, George Mason University: *Designing the Future of Engineering Education through Artificial Intelligence*

2:00 – 3:50 PM, FRIDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 5 INSTITUTIONAL AND INTERDISCIPLINARY PARTNERSHIPS FOR AI IN DESIGN

Moderator: Aditya Johri

Speakers:

Sadan Kulturel-Konak & Abdullah Konak, The Transformative Impact of Student Innovation Competitions and Programs on Entrepreneurial Mindset

Mohammed Alrizqi, Enhancing Engineering Curricula through AI-Enhanced Complex Process Analysis

Lakshmy Mohandas, Leveraging AI-Assisted Discussion Tools in Multidisciplinary EPICS (Engineering Projects In Community Services) Teams: Instructor and Student Insights

Daigo Misaki, Enhancing Innovation in Japanese Engineering Students: The Role of Generative AI in Engineering Design Class

4:00 – 5:50 PM, FRIDAY (SKY CUBE, SHANAHAN 3460)

COLLABORATION INCUBATOR

Moderator: Ade Mabogunje

6:00 PM, FRIDAY (SKY CUBE PATIO, SHANAHAN) RECEPTION

MUSIC BY CUCAMONGA COLLECTIVE

6:45 PM, FRIDAY (GREEN ROOM, PLATT CENTER)

WORKSHOP BANQUET: SUSTAINING TRADITION

HOST: GORDON G. KRAUSS, HARVEY MUDD COLLEGE, CENTER FOR DESIGN EDUCATION

7:00 – 7:50 AM, SATURDAY (DESIGN STUDIO, PARSONS 1287)

BREAKFAST

8:00 – 9:50 AM, SATURDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 6 HUMAN-CENTERED DESIGN, IDENTITY, AND BELONGING

Moderator: Cindy Atman

Speakers:

Aya Mouallem and Sheri Sheppard, A First Prototype: Collaborating with a LLM to Understand Belonging Among Engineering Design Students

Pavan Kumar, How do Co-Curricular Interventions Impact Engineering Identity

Austin Morgan Kainoa Peters, The Manifestations of Conscientious Design in the Context of a Sustainable Engineering Project in Hawai'i

10:00 – 11:50 AM, SATURDAY (DESIGN STUDIO, PARSONS 1287)

SESSION 7 MDW XIV WRAP-UP: WHAT HAVE WE LEARNED?

Moderator: Ade Mabogunje

Speakers: All

12:00 – 1:30 PM, SATURDAY (AVIATION ROOM, HOCH-SHANAHAN)

CLOSING LUNCHEON

KEYNOTE SPEAKERSDr. Andrew B. Williams

Dr. Andrew B. Williams is a leading expert in artificial intelligence, autonomous humanoid robotics, and engineering education. As Dean of Engineering at The Citadel, he leads the engineering program at one of only six senior military colleges in the nation, known for its excellence in undergraduate engineering education. His research spans human-robot interaction, assistive robotics, and machine learning, and he has explored the integration of AI and design thinking across disciplines. At the Center for AI, Algorithmic Integrity, and Autonomy Innovation (AI3), he emphasizes responsible AI development. Dr. Williams has worked at Apple, was a Boeing Welliver Faculty Fellow, and serves on the AWS Machine Learning University

Advisory Board. He has led internationally recognized AI-enabled robotics teams and developed culturally responsive robotics curricula for underrepresented groups.

Dr. Williams' commitment to technical excellence is evident in his continued education through Stanford and MIT programs, along with certifications in machine learning and responsible AI. He has testified on AI workforce development and champions inclusive, entrepreneurial engineering through initiatives like The Citadel's collaboration with the Kern Entrepreneurial Engineering Network. Holding a Ph.D. in Electrical Engineering (AI emphasis) and an MBA, he has helped secure over \$100 million in research and education funding over his career.

Aditya Johri

Aditya Johri is Professor of Information Sciences & Technology and Dr. Lawrence Cranberg Endowed Research Fellow in the College of Engineering & Computing at George Mason University, USA. He studies how technology shapes learning across formal and informal settings and the ethical implications of using technology. He publishes broadly in the fields of engineering and computing education, and educational technology. His research has been recognized with several best paper awards and his edited volumes Cambridge Handbook of Engineering Education Research (CHEER) and International Handbook of Engineering Education Research (IHEER) received the Best Book Awards from Division I of AERA in 2015 and 2024, respectively. He served as a Fulbright-Nokia Distinguished Chair in ICT at

Aalto University, Finland (2021) and he is a past recipient of the NSF Early Career Award (2009), the University Teaching Excellence Award (2002) and the Mentoring Excellence Award (2022) for undergraduate research at George Mason University. He was awarded a Ph.D. in Learning Sciences & Technology Design (2007) from Stanford University, Palo Alto, CA. More information is available at: <http://mason.gmu.edu/~johri>

Filippo Chiarello

Filippo Chiarello is an Assistant Professor of Innovation Management at the University of Pisa. He teaches Design and Innovation at the master's programs in Engineering Management and Data Science. His research focuses on Natural Language Processing techniques for studying technological innovation and human resources-related phenomena. He leads the DETAILs Lab (www.detaills.eu). Additionally, he serves as the co-leader of the Artificial Intelligence X Design (AIXDESIGN) Special Interest Group of the Design Society. At the University of Pisa, he holds the position

of Deputy for Faculty Development.