Board 273: Engineering PLUS (Partnerships Launching Underrepresented Students) - Eddie Bernice Johnson INCLUDES National Alliance

Dr. Karl W Reid, Northeastern University

Karl Reid, Senior Vice Provost and Chief Inclusion Officer, Professor of the Practice at Northeastern University

Mrs. Claire Duggan, Northeastern University

Claire Duggan is currently the Executive Director for The Center for STEM Education at Northeastern University and Co-Principal Investigator for The Engineering PLUS Alliance. She is also current the Co-Principal Investigator for the REU site, REU Pathways and the S-STEM initiative, S-POWER.

Dr. Jacqueline A. El-Sayed, American Society for Engineering Education

Dr. Jacqueline El-Sayed is the Chief Executive Officer for the American Society for Engineering Education. She has leadership experience with the entire pipeline of engineering education.

Mr. Richard R Harris, Northeastern University

Northeastern University College of Engineering: Associate Dean for Diversity, Equity and Inclusion; Engineering (NUPRIME); NELSAMP internal Co-PI and Coordinator; National GEM Consortium Board of Directors; NAMEPA Member; NACME University Partner Liaison; NSBE Chapter Advisor; SHPE Chapter Advisor; College of Engineering Diversity, Equity & Inclusion Standing Committee Co-Chair

Michael Silevitch

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Equipping the engineering workforce to meet national challenges

Research shows that teams with gender and racial diversity are highly effective when innovation and problem-solving are critical goals [1]. Despite a wealth of best practices published over the past several decades on how to broaden participation in engineering, and despite significant investments to increase diversity in the engineering workforce by the National Science Foundation, engineering industries, and universities, women currently comprise just 23% of all engineering bachelor's degrees awarded [2]. Black, Indigenous and People of Color (BIPOC) receive 18% of undergraduate engineering degrees [2], although they constitute 34% of the U.S. population [3]. Women and BIPOC engineering students encounter complex barriers to retention and degree attainment, including campus climates that are not inclusive and inadequate student support programs at some institutions.

Changing the systems that sustain the status quo

The vision of the Engineering PLUS (Partnerships Launching Underrepresented Students) Alliance [4] is to achieve transformative, systemic and sustainable change that will increase the growth in the number of BIPOC and women obtaining undergraduate/graduate engineering degrees to 100,000/30,000 by 2026 and establish a future growth rate that can substantially close the participation gaps. Addressing barriers to women and BIPOC participation in engineering will require changing the systems that hold current policies and practices in place.

The Engineering PLUS Alliance

In August of 2021, the National Science Foundation provided $10 million in seed funding for 5 years to the Engineering PLUS Alliance. It is one of thirteen alliances of higher education institutions funded by NSF INCLUDES, a nationwide initiative designed to build U.S. leadership in science, technology, engineering and mathematics by enhancing the preparation, and increasing the participation of individuals from groups that have been historically underrepresented and underserved in STEM. Engineering PLUS is the only INCLUDES Alliance that focuses primarily on engineering. The Engineering PLUS Alliance is built around core strategies including:

1. Establish a network of 5 Regional Hubs leveraging the Engineering PLUS partnerships with the American Society for Engineering Education, The GEM Consortium, NACME, NAMEPA, NSBE, SWE, AISES and other stakeholders.
2. Create a stEm* PEER Academy to train change agents (stEm PEERs) and accelerate implementation of evidence-based practices within engineering departments.
3. stEm PEERS (Practitioners Enhancing Engineering Regionally) will create Implementation Projects to increase admissions, retention, and graduation rates of women and BIPOC engineers in their home institutions.

4. Measure outcomes, engage in data-driven decision-making and continuously optimize best practices.
5. Implement a sustainability strategy involving industry and key stakeholders.

**E emphasizes Engineering*

Building and leveraging our network

To achieve transformative, systemic, and sustainable change, the Alliance PLUS team aims to recruit over 500 engineering institutions and community colleges into regional hubs, and train more than 400 stEm PEER change agents. We envision the potential for solutions to be strongly informed by national and regional advisory boards that include industry, federal and non-profit stakeholders. Through the strength and breadth of the Engineering PLUS network, the widespread adoption of high-impact practices proven to increase diversity in engineering education is possible and achievable. This systemic change, at scale, will result in the achievement of the Alliance's goal to dramatically increase the number of BIPOC and women engineering graduates annually to 100,000 B.S. and 30,000 MS/PhDs within five years, while simultaneously increasing the diversity of our nation's workforce.

Program leadership

Karl Reid, EdD, Principal Investigator. Senior Vice Provost, Chief Inclusion Officer, Northeastern University

Michael Silevitch, PhD, Co-Principal Investigator. Robert D. Black Distinguished Professor of Engineering, Northeastern University

Claire Duggan, Co-Principal Investigator. Executive Director, Center for STEM Education, College of Engineering, Northeastern University

Richard Harris, Co-Principal Investigator. Associate Dean, Director of Multicultural Engineering Programs, Northeastern University

Jackie El-Sayed, PhD, Co-Principal Investigator. Chief Executive Officer, ASEE

References

[1] S.E. Page, *The Diversity Bonus: How Great Teams Pay Off in the Knowledge Economy.* Princeton, NJ: Princeton University Press, 2019.

[2] Integrated Postsecondary Education Data System (IPEDS). Institute of Education Sciences, National Center for Education Statistics. https://nces.ed.gov/ipeds. [Accessed February 9, 2023].

[3] A. Burke, A. Okrent, K. Hale and N. Gough. "The State of US Science & Engineering 2022. National Science Board Science & Engineering Indicators. NSB-2022-1." *National Science Foundation* (2022).

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