State of Engineering for Global Development

UNITED STATES + CANADA

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The 2019 state of Engineering for Global Development (EGD) in academic institutions in North America.
Disclaimer
To E4C’s knowledge, this is the first report of this kind to attempt to list out all the programs and faculty who work in Engineering for Global Development. If you identify any programs or professors that you believe should also be included in this report, please email us at info@engineeringforchange.org.

Engineering for Global Development (EGD) is an interdisciplinary practice that aims to improve the quality of life of underserved communities worldwide through the design and delivery of technology-based solutions combined with local capacity-building. To do this effectively, practitioners must integrate their technical training with an understanding of economics, entrepreneurship, social science and politics to benefit people living in poverty. Engineering education programs that support this definition are found at many institutions throughout North America. Program-specific aims and goals may be broader or further specialized than the definition presented here. Likewise, terminologies and titles vary - such as “global engineering”, “humanitarian engineering”, “engineering for international development” or development design”; among others. Regardless of a lack of terminology-consensus in this field, this report includes those programs that E4C has identified as supporting our overarching definition of “EGD.”

32 Institutions

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<th>Program Type</th>
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EGD Degree Programs

Master’s + PhD

Arizona State University
Global Technology and Development, MS
Innovation in Global Development, PhD

Colorado School of Mines
MS Humanitarian Engineering + Science, MS

University of Nebraska
IHE Delft/UNL Double Degree Program, MS

Villanova University
Sustainable Engineering, MS

Bachelor’s

Arizona State University
Innovation in Society, BA/BS

Metro State University of Denver
Sustainable Systems Engineering, BS

York University
Engineering & International Development Studies, BS
# EGD Minors & Certificates

<table>
<thead>
<tr>
<th>Arizona State University</th>
<th>Colorado School of Mines</th>
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<tbody>
<tr>
<td>Innovation in Society Minor</td>
<td>Engineering for Community Development Minor</td>
</tr>
<tr>
<td>Innovation for Impact Certificate</td>
<td>Leadership in Social Responsibility Minor</td>
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<tr>
<th>Colorado State University</th>
<th>Duke University</th>
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<tbody>
<tr>
<td>Certificate in International Development</td>
<td>Global Development Engineering Certificate</td>
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<tr>
<th>Engineering Change Lab</th>
<th>Michigan Tech</th>
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<tbody>
<tr>
<td>Global Engineering Certificate</td>
<td>Humanitarian Engineering Minor</td>
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<table>
<thead>
<tr>
<th>Ohio State University</th>
<th>Oregon State University</th>
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<tbody>
<tr>
<td>Humanitarian Engineering Minor</td>
<td>Humanitarian Engineering, Science &amp; Technology Minor</td>
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<tr>
<th>University of Colorado, Boulder</th>
<th>Penn State University</th>
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<tbody>
<tr>
<td>Global Engineering Minor</td>
<td>Engineering &amp; Community Engagement Certificate</td>
</tr>
<tr>
<td>Engineering for Developing Communities Minor</td>
<td>Entrepreneurship &amp; Innovation Minor</td>
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<tr>
<th>University of Michigan</th>
<th>Purdue University</th>
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<tbody>
<tr>
<td>Socially Engaged Design MS track (Design Science)</td>
<td>Global Engineering Studies Minor</td>
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<tr>
<th>University of Toronto</th>
<th>University of Texas, Austin</th>
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<tr>
<th>University of Oklahoma</th>
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<tbody>
<tr>
<td>Water and Sanitation for Health and Sustainable Development Minor</td>
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</tbody>
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**Want to learn more?**

To read about these programs in detail, [click here for the full report.](#)
29 Institutions offering EGD courses

Course examples
Curricular units of teaching that typically last one academic term.

Appropriate technology & Design for global development
University of Toronto

Introduction to energy in global development
Massachusetts Institute of Technology

International development for engineers
University of Western Ontario

Design, evaluate & scale development
University of California, Berkeley

Experiential opportunity examples
Experiential opportunities take place outside of a traditional classroom setting, such as fieldwork, internships, immersions, and study abroad.

Global Health Design Initiative, University of Michigan
Internships, research, and international design projects

iDesign, D80-Prospetity by Design, Michigan Tech
International multidisciplinary field-based design projects

ETHOS, University Dayton
10-week international immersion projects

Want to learn more?
To read about these programs in detail, click here for the full report.
In the US and Canada, 160+ professors at institutions of higher education are currently conducting EGD-related research. Research is defined as practices that systematically investigate EGD-related topics, which lead to new conclusions and developments. These efforts are led by academic faculty members including professors, assistant professors, associate professors, and research professors.

**Disciplines**

- Mechanical, Industrial, & Systems Engineering: 28
- Electrical Engineering & Computer Science: 55
- Environmental & Civil Engineering: 56
- Chemical, Biological, & Agricultural Engineering: 5
- Urban Planning, Architecture, & Transportation: 18

Want to see the complete list of professors? To view the full list of researchers, click here for the full report.
Research Centers

Atlas Institute, CU-Boulder
BEST Lab, UC-Berkeley
Center for Global Engineering, University of Toronto
CITRIS, UC-Berkeley
D80: Prosperity by Design, Michigan Tech
Design Exploration, Brigham Young University
Development Impact Lab, UC-Berkeley
D-Lab, MIT
d.school, Stanford University
Future of Innovation in Society, Arizona State University
GEAR Lab, MIT
Global Design Lab, University of Michigan
GEPP, Purdue University
Humanitarian Engineering, Colorado School of Mines
Humanitarian Engineering, Oregon State University
Humanitarian Engineering Center, Ohio State University
HESE, Penn State University
Institute for Engineering & Humanity, SMU Lyle School of Engineering
ICTDLab, University of Washington
International Development Group, MIT
LEAPS, Arizona State University
Michigan ICTD, University of Michigan
Mortenson Center in Global Engineering, CU-Boulder
Servant Engineering Program, George Fox University
Sienko Research Group, University of Michigan
Water and Energy Research Lab, University of Toronto
Water for Food Institute, University of Nebraska
WaTER Center, University of Oklahoma

28 Research Centers
This list includes programs and labs that offer graduate-level research opportunities in EGD.

Want to learn more?
To read about these programs in detail, click here for the full report.
Case study 1
Purdue University
Indiana, USA

Engineering Projects in Community Services (EPICS) Program
- Year long service-learning design course for academic credit
- Access to Innovation for International Development Lab and instructors
- Annual conference
- Adopted by over 30 institutions (19 in North America) and 100+ high schools since 1995

Global Engineering Programs + Partnerships (GEPP)
- Global Engineering Studies Minor
- Language study
- Study abroad
- Cultural training
- Domestic + international work/research experiences
- Global design team projects

Courses
- Engineering in a Global Context
- Global Engineering
- Globalization and Engineering
- Global Design Teams

Photo Credit: Purdue University/Mark Simon
Case study 2

University of Toronto
Toronto, Canada

Centre for Global Engineering
+ Global Engineering Certificate
+ Variety of applied engineering projects
+ Disaster response
+ Water and energy projects
+ “Re-invent the toilet challenge”
+ Healthcare technology design
+ Various graduate fellowships available

Water and Energy Research Lab (WERL)
+ Mechanical and industrial engineering research lab
+ Research focuses: food, water sanitation, healthcare, and energy

Courses
+ Innovative Technologies and Organization in Global Energy Systems
+ Technology, Engineering, and Global Development
+ Appropriate Technology and Design for Global Development
+ An Interdisciplinary Approach to Global Challenges
EGD Conferences

Some examples of conferences with EGD focus and/or EGD-related tracks. For more, click here.

- ASME International Design Engineering Technical Conference (IDETC)
- ACM Conference on Human Interaction (CHI)
- World Congress of Innovative Technology and Sustainable Engineering
- IEEE Global Humanitarian Technology Conference
- International Conference on Sustainable Agriculture Technologies (ICSAT)
- Colorado WASH Symposium
- Monitoring, Evaluation, Research, and Learning (MERL) in Development Tech
- University of North Carolina Water & Health Conference
- University of Michigan Sustainability & Development Conference
- Design of Medical Devices Conference
- World Reconstruction Conference
- Water Engineering and Development Centre International Conference

Want to learn more? To read about these programs in detail, click here for the full report.