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  Ph.D. Biomedical Engineering, Virginia Tech & Wake Forest University
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  Ph.D. Materials Science & Engineering, University of California - Berkeley
  M.S. Materials Science & Engineering, University of California - Berkeley
  B.S. Physics, Beloit College
Improving Engineering Curricula and Instruction
Institutional Transformation
Diversity of Students and Faculty
Improving Infrastructure
Advancing Research and Knowledge

Lead Program Director of Engineering Education
at the National Science Foundation

Founding Chair, Wake Engineering
The Vision of the Engineer of 2020…
laying a partial foundation for Wake Engineering


No profession unleashes the spirit of innovation like engineering. From research to real-world applications, engineers constantly discover how to improve our lives by creating bold new solutions that connect science to life in unexpected, forward-thinking ways. Few professions turn so many ideas into so many realities. Few have such a direct and positive effect on people’s everyday lives. We are counting on engineers and their imaginations to help us meet the needs of the 21st century.
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CALL for ACTION: Develop Attributes of the 2020 Engineer

**PROBLEM SOLVING CAPABILITIES**

- VISION
- INGENUITY
- LEADERSHIP ABILITIES
- CONSCIENCE
- CREATIVITY
- SCIENTIFIC INSIGHT
- CURIOSITY
- DETERMINATION
Attributes of the Engineer of 2020

Albert Einstein: Scientific Insight
Eleanor Roosevelt: Conscience
Gordon Moore: Problem Solving Capabilities
Lillian Gilbreth: Ingenuity
Pablo Picasso: Creativity
Martin Luther King Jr.: Vision
Children: Curiosity
Bill Gates: Leadership Abilities
Wright Brothers: Determination
CALL for ACTION: Transform Engineering Curricula

Offer Responsive Curricula and Well-Rounded Educators

Promote Cross-Disciplinary Fertilization

Support Leadership Positions

Effectively Support, Nurture, and Welcome Underrepresented Groups

Have a Focus on Sustainable Development

Having Academia and Industry Working Together to Educate

Reshape the Image of Engineers and Engineering

CALL for ACTION:
Engineers work collaboratively with other disciplines to solve GRAND CHALLENGES

National Academy of Engineering’s
Grand Challenges for Engineering
Team-based projects developing skills in decision making, leadership, written and oral communication, organization/time management, cultural awareness, and problem solving.
“Innovation is the adoption of inventions, not the invention itself, and engineers are pivotal in enabling this adoption.”

-Marie Thursby

CALL for ACTION: Increase Emphasis on INNOVATION and ENTREPRENEURSHIP
Empower students to become self-directed learners who are fearless in the face of a complex problem.
Empowered to be agents of change and leaders of change

Taking ownership and initiative of their learning

Active participants in formal and informal learning opportunities

Engaged with the broader WF community and locality

Embracing diversity and inclusion

Seekers and creators of knowledge

Partners in innovation and engineering education

Taking advantage of their liberal arts education

See failure as an opportunity to learn and grow
The Vision of the Wake Engineer

**Showcase**: Versatility, depth & breadth of knowledge, leadership, agency

**Breadth of Experiences**: Curricular projects, Internships, Undergraduate Research, Study Abroad, Community Service Projects….

**Collaborators**: Engineers and Non-engineers, diversity of disciplinary collaborators, membership with professional societies, non-profits, etc.

**Skills**: from the curriculum and outside of the curriculum (professional certifications, licensures like EIT, etc.)

**Knowledge**: from the curriculum and outside of the curriculum (courses, methods, techniques, etc.)

**Attitudes**: growth mindset, motivation, engagement, personal and professional identity, ….

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**Curriculum balancing Theory & Practice**

Projects every semester (design, research, community driven, industry driven, etc.)

**Partnerships with diverse faculty and external stakeholders**

**Prep for FE Exam**

**Curriculum flexibility to align with personal interests**
1st Year Engineering Experience

- Represent the 4-year curriculum
- Problem and project based
- Understand engineering as a science, as a humanistic experience, as an art, in design thinking and problem solving, as change makers
- Understand engineers in a societal context
- Embrace the liberal arts engineer
Let Your Assumptions Be Challenged

Olga
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