Engineering is technology and applied science in direct service to humanity.
At Notre Dame, Engineering is a powerful force for good. Informed and guided by our Catholic tradition, our world class research and educational programs engineer a peaceful, healthy, and sustainable world.
College of Engineering Mission

- Committed to an unsurpassed undergraduate education in a top tier research institution
- Determined to be a force for good in the world
- Building capacity, infrastructure, and human resources to enable the impact we desire
- Developing the next generation of world leaders in engineering, with ethics at the core
Essential Needs for a World Class College of Engineering

- Critical Mass of Exceptional and Diverse Faculty
- Well rounded undergraduate leaders who help create the nation and world of the future
- Coordinated and Strong Staff Support
- World Class Infrastructure
- Commitment to a Rigorous and Innovative curriculum
- Organizing Themes that Build Bridges Across Disciplines and Promote Synergy
Where are we now?

The College in 2012
2012 College of Engineering

Centers, Institutes, and Research Initiatives

Computer Science and Engineering
Electrical Engineering
Aerospace and Mechanical Engineering
Chemical and Biomolecular Engineering
Civil Engineering and Geological Sciences
Centers, Institutes and Major Research Initiatives

- The Center for Sustainable Energy at Notre Dame (cSEND)
- The Notre Dame Nanotechnology Center (NDnano)
- The Wireless Institute
- The Institute for Flow Physics and Flow Control (FlowPAC)
- The Advanced Diagnostics and Therapeutics Initiative
- Biomechanics and Biomaterials in Orthopaedics
- The Midwest Institute for Nanoelectronics Discovery (MIND)
- The Center for Environmental Science and Technology (CEST)
- The Interdisciplinary Center for Network Sciences and Applications (iCeNSA)
- The Materials Science of Actinides Energy Frontier Research Center
- Biometrics Initiative
- Structural and Wind Engineering and Risk Assessment
- Computational Science and Engineering
Some Key Facts about Us

- 118 T&R Faculty, 24 Research Faculty, 11 SPF Faculty
- 460 Graduate Students, 1400+ Undergraduates including freshmen
- $41+ M Annual Research Expenditures (2010-2011)
- 56 PhDs graduated, 295 BS degrees graduated (2012)
- 30 Filled Endowed Professorships, Directorships, and Collegiate Chairs (2012)
- More than $100 Million in benefaction from our alumni and donors over last decade
Growth in Our Faculty (2008-2012)
Some Recent Faculty Awards & Accomplishments

Great Faculty are the Foundation of a Great University
Election of Joan Brennecke to the NAE!
Some New Fellows in the College

Panos Antsaklis
AAAS Fellow

Tom Corke
AIAA Fellow

Pat Flynn
IEEE Fellow
IAPR Fellow

Eric Jumper
DEPS Fellow
Arezoo Ardekani and Philippe Sucosky Receive NSF CAREER Awards
Two New MURIs Awarded to ND Faculty

H.J. Fernando  Patrick Fay  Debdeep Jena  Huili (Grace) Xing
Our Faculty are Translating their Research and Scholarship into Practice
Our graduate students are winning numerous awards and scholarships

...A few examples...

CSE: Estefan Ortiz, 2nd Place in 2011 National Security Innovation Competition

CEGEOS: NSF fellow Keshia Koehn wins CUAHSI Pathfinder Fellowship

As are our undergraduates... who are benefitting from a world class education

CSE: Jake Lussier, 2011 NSF Grad Fellow, 2011 Steiner Award, 2010 Goldwater Scholar, Stanford PhD Student in CSE

CEGEOS: PCI Announces 2011 Big Beam Contest Winners

CBE: Yamil Colón, Fulbright Fellow

Dueling ‘bots
...Our Alums are winning awards & becoming faculty at top universities

Jean-Baptiste Thibault, EE PhD 2006, Edison Pioneer Award

Caitlyn Butler
CEGEOS PhD 2010
Asst. Prof. UMASS Amherst

Rachel Getman
CBE PhD 2009
Asst. Prof. Clemson

Jean-Baptiste Thibault, EE PhD 2006, Edison Pioneer Award
Our Faculty and Students are “A Force for Good in the World...”

ND SEED builds footbridges in rural communities stricken with poverty in Central America

Jim Schmiedeler receives 2012 Ganey Award for community-based research

IEP Summer Program Inspires Young Engineers

The College of Engineering at the University of Notre Dame
Taking it to the next level

2017 (and beyond...)
Strategic Planning
Organizing Themes
Organizing Themes that Build Bridges in the College of Engineering

- Environmental Sustainability (ES)
- Energy (E)
- Economic Development (ED)
- Human Health and Well Being (HHWB)
- Personal and National Security (PNS)
The Organizing Themes

- Each theme represents a “human good” and can be considered an “end” rather than a “means”
- Themes are undergirded by *enabling sciences and technologies* in which our College has historic strengths
- Themes resonate with our tradition and with the mission of the University and that enables benefaction and connections
- Themes are all in high profile areas with substantial funding opportunities
Enabling Sciences and Technologies

- Environmental Sustainability (ES)
- Energy (E)
- Economic Development (ED)
- Human Health and Well Being (HHWB)
- Personal and National Security (PNS)
- Nanoscience and Nanotech (N)
- Informatics, Bioinformatics, and Data Sciences (IBDS)
- Materials and Biomaterials Discovery and Synthesis (MBDS)
- Computational Science and Engineering (CSE)
- Fluid Mechanics, Microfluidics, and Flow Control (FMMFC)
- Biomechanics and Robotics (BR)

Communications, Networking, and Cyber-Physical Systems (CNC S)

Environmental & Materials Chemistry (EMC)
How does structure enable this vision?

- Our Centers, Institutes, and Major Research Initiatives provide enabling science and technologies and provide applications in the five organizing themes.

- The themes and enabling sciences and technologies serve to bridge disciplines, provide organizational structure to create synergies, and to provide platforms for large center activities.
Opportunities we are poised to pursue or add strength to...

- Hazard and Risk Mitigation (PNS, ES, HHWB, CNCS, CSE, EMC, ...)
- Lab on a Chip (HHWB, ES, ED, MBDS, ...)
- Sustainable Energy (E, EMC, ES, ED, ...)
- Propulsion (FMMFC, ED, E)
- Computational and Data Science (CSE, IBDS, PNS, ...)
- Global Development (ED, ES, E, HHWB, PNS, WCT, ...)
- Cost Effective Healthcare (HHWB, ED, IBDS, FMMFC, ...)
- Advanced Circuitry (N, CNCS, IBDS, ED, PNS, ...)
How the College & University are Facilitating...

- Corporate partnerships (new capabilities and focus in CFR) for success at NSF and elsewhere
  - New personnel
  - Some successes: e.g. Boeing, IBM, ...
- Develop and foster deeper relationships with international and minority serving Universities
  - Trinity College Dublin (Naughton)
  - PUC (1st ever Dual PhD Program)
  - UPR Mayaguez
  - IIT Gandhinagar
  - Tsinghua; PU Valencia; UTEP, FIU
College and University Support

- Seed funding to establish relationships (internal and external)
  - SAPC/SRI Major Funding and Seed Funding
  - Investments in Infrastructure (COMSOL; MITERAC: New Automated Machine Shop in Hessert; New Design Studio in Stinson-Remick)
- Seed Funding to Establish External Partnerships
- Provide more intensive grant writing capabilities and project management
  - Research Office Staff Embedded in the College
- Development for endowed chairs, start up funds particularly for hires that will foster one or more of the theme areas.
  - e.g., ‘Recent’ Hires: Joe Fernando, Greg Timp, Gretar Tryggvason, Bert Hochwald... hopefully more to come...
Some Strategic Goals...

- Continue to enhance the diversify of our most important assets: our faculty, staff and students
- Grow Number of Graduating Undergraduates to > 16-18% of University: > 340-370 BS graduates each year
- Empower our students to pursue their vocation: e-portfolios, authentic professional experiences, integrated design/innovation, plentiful undergraduate research opportunities
- Increase the scale and magnitude of our scholarly research program: 80+ PhDs graduated per year, $60-70 M in research expenditures
- Increase the impact of our scholarship and research: large center grants, enhanced commercialization and translation, greater national recognition, media coverage
Some committees and efforts at enhanced communication

- Committee on Undergraduate Engagement
- Committee on Mission
- Research Council
- Dean’s Advisory Council

I need your advice, support, and input. Faculty and Departments should consider what is most needed and communicate to Chairs and other groups.
Some Key Challenges

- Space
- Research infrastructure and support
- Communication
- Effective Tech Transfer Strategy and Policy
- South Bend and local community
- Integration of teaching and research mission
- Connection to Catholic identity and mission
The Key to the Future is Excellent Communication and Teamwork

A Great University is A Great Faculty Working Together
In Memoriam

Nai-Chien Huang
Professor Emeritus
AME

J. Keith Rigby
Associate Professor
CEGEOS

Nai-Chien Huang
Professor Emeritus
AME

Sidney Kelsey
Professor Emeritus
CEGEOS