Duke Energy Academy at 

Purdue University

Careers in Engineering & Technology

Dr. Robert L. Bowen, P.E.
Founder and Chairman
WOULD YOU LIKE THE CHICKEN ADOBO OR ROAST BEEF AU JUS?

HMM... THAT'S A HUGE DECISION... I NEED TO TEXT FOR SOME ADVICE...

COULDN'T WE JUST ASK YOUR FIANCE?

THAT'S WHO I JUST TEXTED!

Go with chicken!!
# How They Ranked

Nearly 430 companies who hired more than 40,000 new bachelor’s degree graduates in the past year are included in the annual survey below. Below are their years for the schools that continue to be best graduates overall.

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>MAJORS</th>
<th>NUMBER OF UNDERGRADUATES</th>
<th>E-LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennsylvania State University</td>
<td>Business</td>
<td>$15,290</td>
<td></td>
</tr>
<tr>
<td>Texas A&amp;M University</td>
<td>Agronomy</td>
<td>$3,387</td>
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</tr>
<tr>
<td>University of Illinois Urbana-Champaign</td>
<td>Agronomy</td>
<td>$1,568 - $27,600</td>
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</tr>
<tr>
<td>Purdue University</td>
<td>Agronomy</td>
<td>$2,400</td>
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</tr>
<tr>
<td>Arizona State University</td>
<td>Agronomy</td>
<td>$1,132</td>
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</tr>
<tr>
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<td>Agronomy</td>
<td>$1,700</td>
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<tr>
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<tr>
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<td>$8,415</td>
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<tr>
<td>University of Florida</td>
<td>Agronomy</td>
<td>$5,049</td>
<td></td>
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<tr>
<td>Carnegie Mellon University</td>
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<td>$42,136</td>
<td></td>
</tr>
<tr>
<td>Brigham Young University</td>
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<td>$4,820</td>
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<tr>
<td>Ohio State University</td>
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<td>$8,706</td>
<td></td>
</tr>
<tr>
<td>Virginia Polytechnic Institute</td>
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<tr>
<td>Cornell University</td>
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</tr>
<tr>
<td>University of California – Berkeley</td>
<td>Agronomy</td>
<td>$12,462</td>
<td></td>
</tr>
<tr>
<td>University of Wisconsin</td>
<td>Agronomy</td>
<td>$9,050</td>
<td></td>
</tr>
<tr>
<td>University of California, Los Angeles</td>
<td>Agronomy</td>
<td>$10,781</td>
<td></td>
</tr>
<tr>
<td>Texas Tech University</td>
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<td>$8,260</td>
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<tr>
<td>West Virginia State University</td>
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<td>$6,029</td>
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</tr>
<tr>
<td>University of Virginia</td>
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<td>$10,830</td>
<td></td>
</tr>
<tr>
<td>Rutgers University</td>
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<tr>
<td>University of North Dakota</td>
<td>Agronomy</td>
<td>$39,919</td>
<td></td>
</tr>
<tr>
<td>Massachusetts Institute of Technology</td>
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<td>$39,212</td>
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</tr>
<tr>
<td>University of Southern California</td>
<td>Agronomy</td>
<td>$41,712</td>
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</tr>
<tr>
<td>Michigan State University</td>
<td>Agronomy</td>
<td>$9,428</td>
<td></td>
</tr>
<tr>
<td>University of North Carolina at Chapel</td>
<td>Agronomy</td>
<td>$5,922</td>
<td></td>
</tr>
</tbody>
</table>
The rewarding and the ruinous
Total cost of a degree*, 2013, $’000
Selected colleges, average

<table>
<thead>
<tr>
<th>College</th>
<th>Annual return over 20 years†, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Virginia</td>
<td>17.6</td>
</tr>
<tr>
<td>Georgia Tech</td>
<td>17.1</td>
</tr>
<tr>
<td>Harvard</td>
<td>15.1</td>
</tr>
<tr>
<td>William and Mary</td>
<td>14.8</td>
</tr>
<tr>
<td>University of Washington</td>
<td>14.8</td>
</tr>
<tr>
<td>Stanford</td>
<td>14.2</td>
</tr>
<tr>
<td>MIT</td>
<td>13.9</td>
</tr>
<tr>
<td>U.C. Berkeley</td>
<td>13.5</td>
</tr>
<tr>
<td>Caltech</td>
<td>13.3</td>
</tr>
<tr>
<td>Dartmouth</td>
<td>13.3</td>
</tr>
<tr>
<td>Yale</td>
<td>13.3</td>
</tr>
<tr>
<td>Princeton</td>
<td>13.2</td>
</tr>
<tr>
<td>Purdue</td>
<td>13.2</td>
</tr>
<tr>
<td>UCLA</td>
<td>12.8</td>
</tr>
<tr>
<td>South Dakota School of Mines</td>
<td>12.7</td>
</tr>
<tr>
<td>Harvey Mudd College</td>
<td>12.6</td>
</tr>
<tr>
<td>Columbia</td>
<td>12.6</td>
</tr>
<tr>
<td>Brigham Young</td>
<td>12.6</td>
</tr>
<tr>
<td>University of Pennsylvania</td>
<td>12.5</td>
</tr>
<tr>
<td>Brown</td>
<td>12.1</td>
</tr>
<tr>
<td>Babson</td>
<td>11.8</td>
</tr>
<tr>
<td>Amherst</td>
<td>11.6</td>
</tr>
<tr>
<td>Manhattan</td>
<td>11.0</td>
</tr>
<tr>
<td>North Dakota State University</td>
<td>11.0</td>
</tr>
<tr>
<td>New York University - Poly</td>
<td>10.9</td>
</tr>
<tr>
<td>Stevens Institute of Tech.</td>
<td>10.6</td>
</tr>
<tr>
<td>Carnegie Mellon</td>
<td>10.2</td>
</tr>
<tr>
<td>Georgetown</td>
<td>9.9</td>
</tr>
</tbody>
</table>

*Estimated costs based on 2013 data
†Assumes a 6% average inflation rate
10 Colleges with the Best Career Services

#1: Northeastern University
#2: Pennsylvania State University
#3: Purdue University
#4: Barnard College
#5: Bentley University
#6: University of Florida
#7: Massachusetts Institute of Technology
#8: University of Notre Dame
#9: Texas A&M
#10: Princeton University
Best Career Services Resources to Get You Employed

#1: High Graduation Rates

#2: Strong Alumni Networks

#3: Innovative Career Fairs

#4: Top-Dog Recruiter Connections
Purdue

- Gold Rush
- World Renown
- Value driven – David Wolf
- On a roll
- Big Ten
- Bargain of the year
- Drug free
Expected Salaries

- Non-high school grad - $23,000
- High school grad - $33,000
- 2 year college - $39,000
- 4 year college - $55,000
  - Delta - $22,000 per year
  - $1 million in a lifetime
Need to know
United States:
average annual pay
By educational level, 2013 prices, $'000

Bachelor's degree
Associate's degree
High-school diploma

1970 80 90 2000 13
• 250,000 unemployed in Indiana
• 2.5 jobs for every STEM grad
• For every (5) non-STEM grads, there is 1 job
• Many of today’s job opportunities are in supervision
Bowen Engineering

• Senior Managers – All engineers
• 75 employees – Purdue engineers
• 30 engineering interns
• My dad was a Purdue Civil
• Bowen Lab
• I teach in Construction Engineering
  • Many of our top managers help with the class
Leadership

- Maintain High Values & Standards
- Have Genuine Concern for Others

*Harvard Business School*
Shanghai Ranking's Global Ranking of Academic Subjects 2016 Press Release
Wednesday, June 15, 2016
Shanghai, People's Republic of China

Top 10 Institutions in Civil Engineering

<table>
<thead>
<tr>
<th>Rank</th>
<th>Institution</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Purdue University - West Lafayette</td>
<td>United States</td>
</tr>
<tr>
<td>2</td>
<td>Technical University of Denmark</td>
<td>Denmark</td>
</tr>
<tr>
<td>3</td>
<td>Tsinghua University</td>
<td>China</td>
</tr>
<tr>
<td>4</td>
<td>The Hong Kong Polytechnic University</td>
<td>China-Hong Kong</td>
</tr>
<tr>
<td>5</td>
<td>Tongji University</td>
<td>China</td>
</tr>
<tr>
<td>6</td>
<td>University of California, Berkeley</td>
<td>United States</td>
</tr>
<tr>
<td>7</td>
<td>Georgia Institute of Technology</td>
<td>United States</td>
</tr>
<tr>
<td>8</td>
<td>Massachusetts Institute of Technology (MIT)</td>
<td>United States</td>
</tr>
<tr>
<td>9</td>
<td>City University of Hong Kong</td>
<td>China-Hong Kong</td>
</tr>
<tr>
<td>10</td>
<td>Eindhoven University of Technology</td>
<td>Netherlands</td>
</tr>
</tbody>
</table>

Civil Engineering has the lowest number of institutions ranked as well as published because of the lower scholarly output of universities in this subject. Chinese and American universities are well presented in the top 10. Professor Rao S. Govindaraju, Bowen Engineering Head of Lyles School of Civil Engineering at Purdue University, comments: "Purdue's Lyles School of Civil Engineering is honored to be recognized in the 2016 Shanghai Ranking's Global Ranking of Academic Subjects".
Life of an Engineer

Jared Weber
Project Manager, Bowen Engineering
Engineering
vs.
Engineering Technology
What makes a good engineer?

• Math and science-oriented

• Good with your hands - shop

• Some intellectual curiosity

• Problem solver

• A desire to go to the head of the class
  • Expected of Purdue grads

• Competitive
What is a typical career?

- Project Engineer
  - Estimating
  - Project Support
- Project Manager
  - Project Responsibility
- Senior Manager
  - Multiple Projects
- Area Manager
- Company Executive
Benefits of an Engineering Degree

- Shortage of engineers – job opportunities
- Better wages/salary
- More rigorous curriculum – broader education
- Greater opportunity for advancement
- Professional license
- Launching pad to other professions
Hidden Values of Being an Engineer

- Value-driven - Purdue
- Project driven
- Field experience
- Cutting edge of industry
- Certain prestige
- Pride
A Broader View of Engineering

- Build America – our country is desperate for graduate engineers
- Service to community
- Bowen Engineering hires graduate engineers
- Our customers love us
Water and Wastewater
Bowen Project Highlights
We shall not defeat any of the infectious diseases that plague the developing world until we have also won the battle for safe drinking water, sanitation, and basic health care.

Kofi Annan
7th Secretary-General of the United Nations
Southport WWTP
Current Contract Amount: $93.5 M
Durkee’s Run CSO

Getting Through the Intersection

Scope: $43.7 million

- Start Date: July 5th
- Road to be Opened: August 19th
- Develop a Plan
- Get the Buy In
- Hold People Accountable
- Execute the Plan
- Don’t be Afraid to Change as Better Ideas Come Along
NJAW Ranney Station
New Water Treatment Plant, New Jersey American Water
Scope: $9.8 million
More Photos
Engineers Innovate & Change the World

Chris Durnil, CPC
Purchasing Manager, Bowen Engineering
Consider, we didn’t invent electricity, we harnessed it…

• Ben Franklin
• Michael Faraday
• Thomas Edison
• Nikola Tesla
• George Westinghouse
• James Watt
• Andre Ampere
• George Ohm
Energy & Industrial Projects
BOWEN BY THE NUMBERS

700+ EMPLOYEES
70 GRADUATE ENGINEERS
16 LICENSED PEs
32 2016 SUMMER INTERNS
6 REGIONAL OFFICES
38 STATE LICENSES

WHAT DO ALL THOSE ENGINEERS DO?

- SENIOR MANAGEMENT
- PROJECT MANAGEMENT
- ACCOUNTING
- CONTROLS GROUP
- PURCHASING
- SAFETY
- QUALITY
- BUSINESS DEVELOPMENT
- HUMAN RESOURCES

THE TOP 400 CONTRACTORS

$1.3 Billion
REVENUE OVER LAST 5 YEARS
Bowen Consulting Group, LLC

- Heavy Lift Design & Execution
- Heavy Transport Design
• Detailed planning of the work

• Includes foremen, customer, and craft in the process

• Emphasis on recording, using and referencing lessons learned

• SQP = All interconnected.
  (Safety and Quality carry as much weight as production)
BIM
EIA projects 48% increase in world energy consumption by 2040

World energy consumption by source, 1990-2040
quadriillion Btu

- liquid fuels
- natural gas
- coal
- renewables
- nuclear

U.S. primary energy production by major source, 2015

<table>
<thead>
<tr>
<th>Source</th>
<th>Quadrillion Btu</th>
</tr>
</thead>
<tbody>
<tr>
<td>natural gas</td>
<td>26</td>
</tr>
<tr>
<td>coal</td>
<td>20</td>
</tr>
<tr>
<td>crude oil</td>
<td>18</td>
</tr>
<tr>
<td>nuclear electric power</td>
<td>8</td>
</tr>
<tr>
<td>biomass</td>
<td>5</td>
</tr>
<tr>
<td>natural gas plant liquids</td>
<td>4</td>
</tr>
<tr>
<td>hydroelectric power (conventional)</td>
<td>2</td>
</tr>
<tr>
<td>geothermal, solar, wind</td>
<td>2</td>
</tr>
</tbody>
</table>

DATA

LET'S USE IT TO LIVE MORE EFFICIENT
“The stone age did not end because the cavemen ran out of stone.”

Sheik Ahmed Zaki Yamani

HOW ARE YOU GOING TO IMPACT THE WORLD?
The Road to Success

• Have High Expectations
  – Make A’s at school
• Give Back
• Believe you can make a difference
• Positive attitude
• Genuine concern for others
• Leaders build leaders
  – It is not about you
Advice to my Grandson On His First Job

• Be early to work.
• Be watchful of what is going on around you. Offer to help the guy in the next cubicle.
• Ask questions.
• Positive attitude.
• Compliment club.