

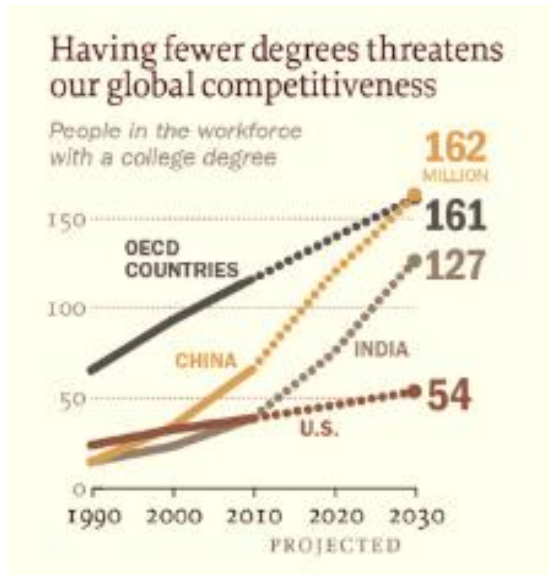
*IV Technical Conference on Chemical and
Biological Engineering PROCESA 2016-
Universidad Nacional de Colombia - Bogotá*



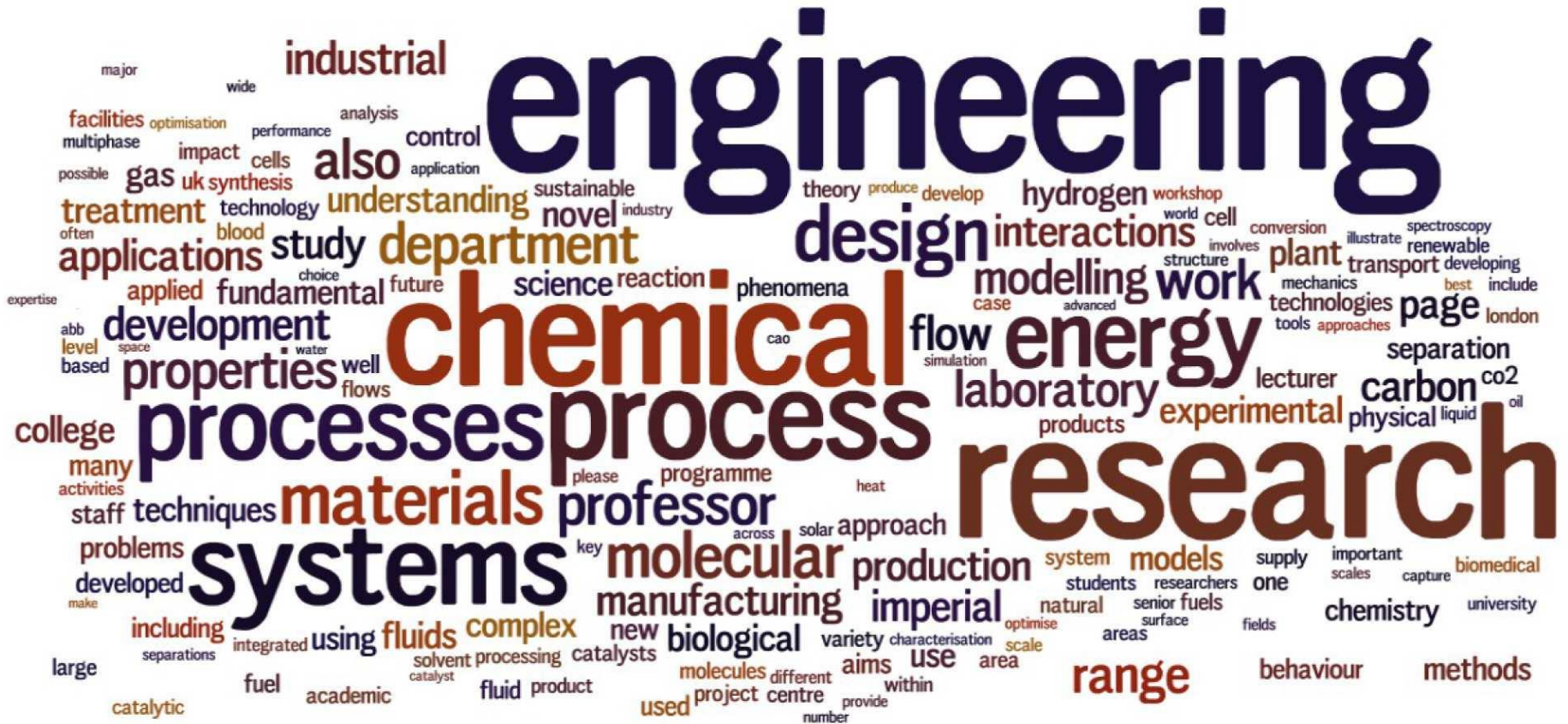
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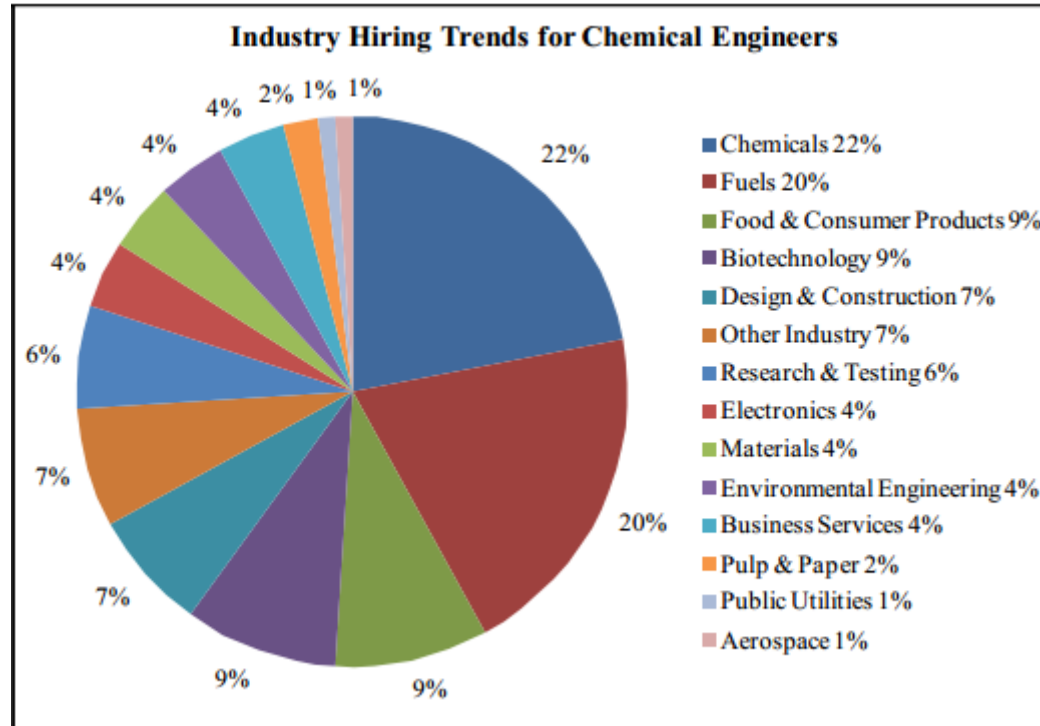
Perspectives in Chemical Engineering

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- Can technology reduce the cost of education?
- Can technology reduce the failure rate?
- Can technology improve the quality of content creation?
- Should we embrace Massive Open Online Courses (MOOCs) as the answer? edX, Coursera, Udacity.

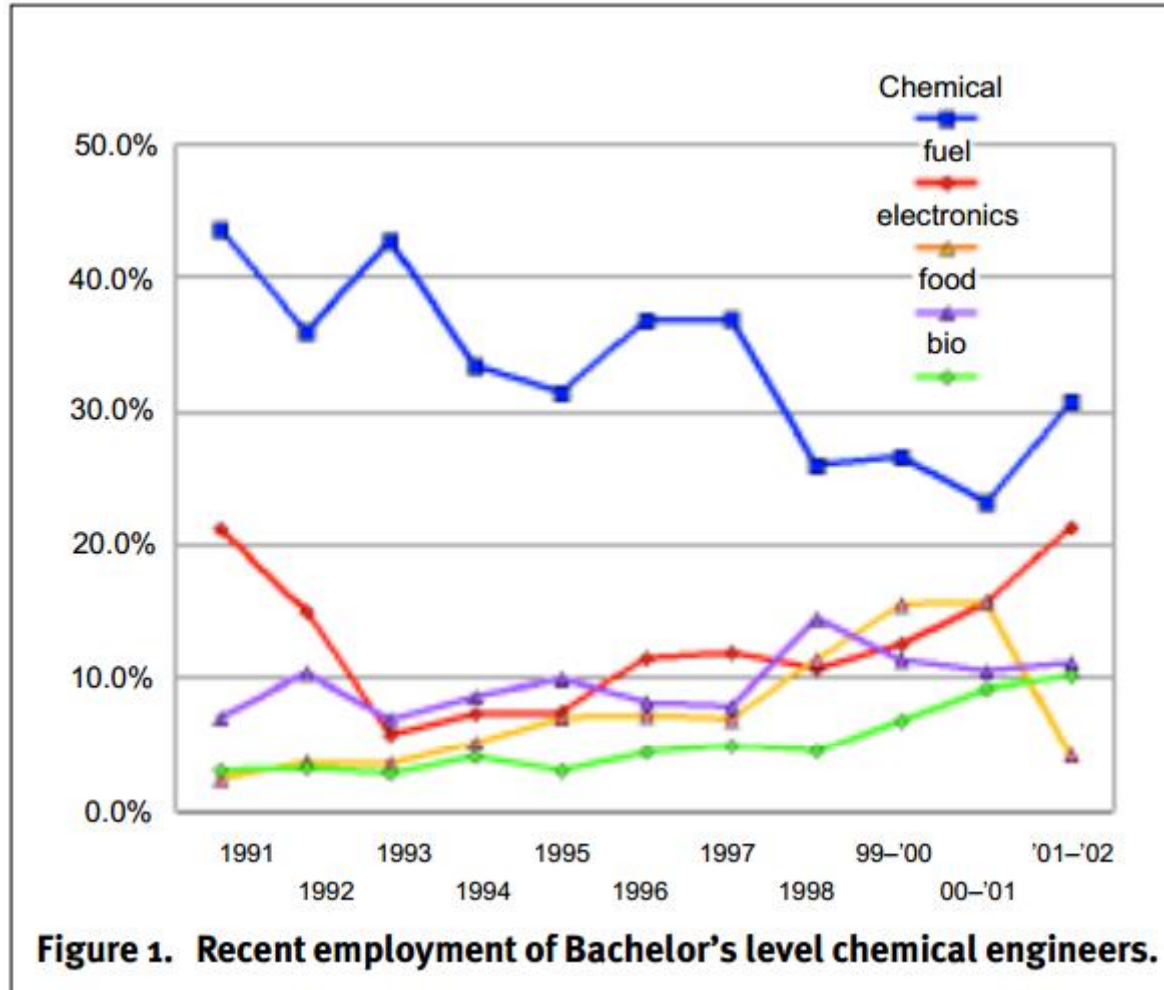


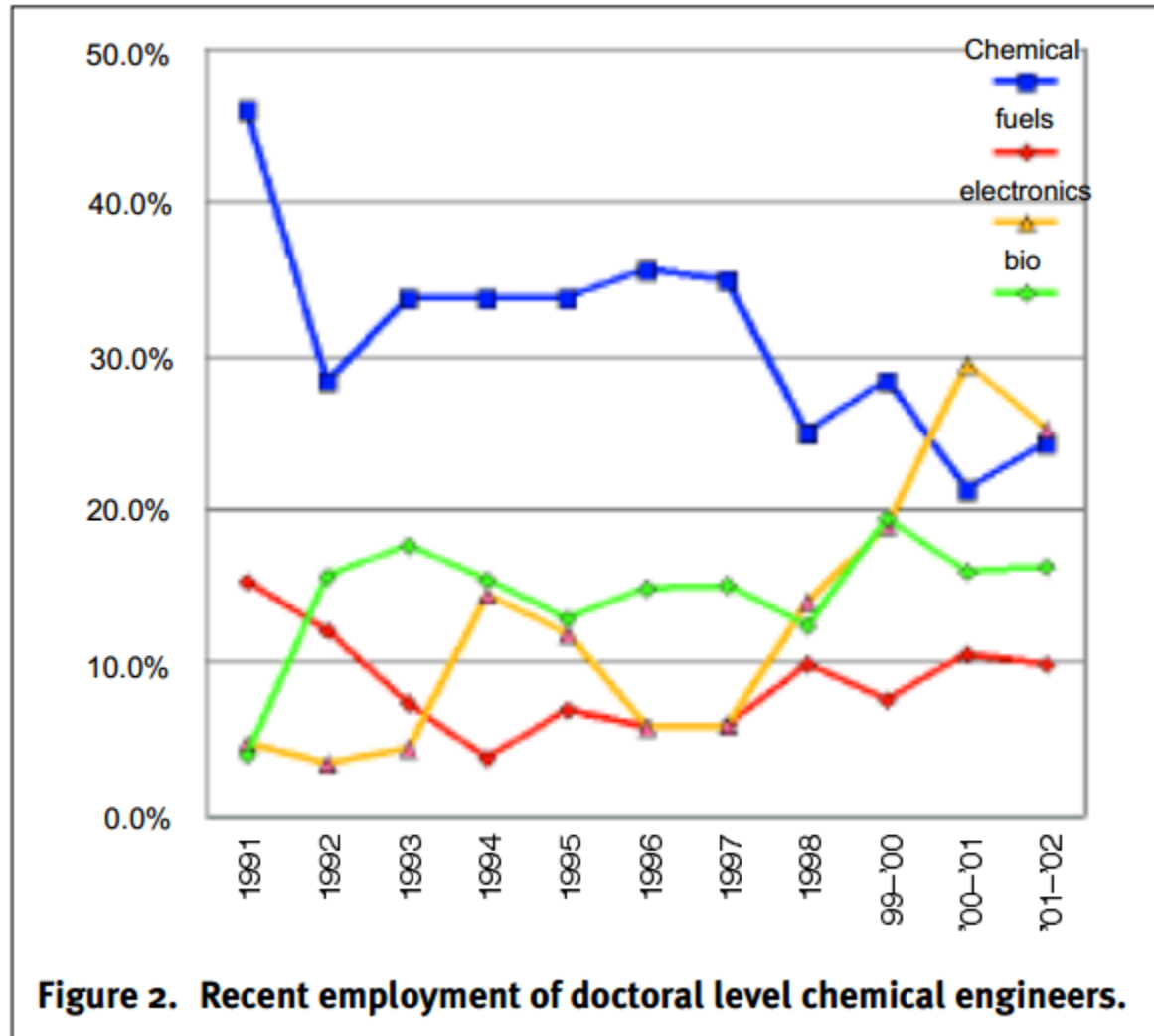


FUTURE OF CHEMICAL ENGINEERING JOBS:

Integrated Nano/Biological Platforms and the associated ability to rapidly manufacture these devices for specific, custom applications

- Biotechnology emerging into a “real” commercial activity
- Biomedical devices are beginning to emerge into the market place
- MEMS devices going commercial
- Nano technology.....looking for applications
- Advanced materials including: bi functional materials, conducting polymers, bio materials (e.g., tissue engineering) continue development for specialized applications





Strengths, Weaknesses Opportunity and Threats (SWOT) analysis

STRENGTHS

- Chemical Engineers have the broad mathematics and science background to take the leadership position
- Chemical Engineers have the transport background
- Chemical Engineers have the design background
- Chemical Engineers have the ability to lead and contribute to interdisciplinary teams
- Chemical Engineers in the past have shown the ability to adapt

WEAKNESS

- Chemical Engineers will need to establish themselves as leader in this area (unlike environmental/ bio/ Nano)
- Chemical Engineers need to reshape their curriculum to strategically position themselves for innovation and change
- Chemical Engineers needs to allow flexibility and change
- Chemical Engineers must look at design in new ways (e.g, factories on a chip, nano medical delivery systems for customized medicine, etc)
- Chemical Engineers need to reestablish dominance in innovation

OPPORTUNITY

- Chemical Engineering becomes first to “molecular engineer and molecular design”
- Chemical Engineers maintain their broad base
- Chemical Engineering job market stabilizes and broadens
- Chemical Engineers will again be at the cutting edge not following or just one of the crowd
- Chemical Engineers will drive “western commercial activities”, while developing designs, processes, and strategies for sustainable and environmentally sound products

THREATS

- Paralysis by analysis
- Unwillingness to change
- Lack of acceptance, and acceptance in a timely manner
- Direction is not correct
- Other Disciplines move more quickly and Chemical Engineers are again following

Baby Boomers (YOB: 1946-1964)	Generation X (YOB: 1965-1981)	Millennials (YOB: 1982-2000s)
<ul style="list-style-type: none"> ■ Accept the rules ■ Passionate about careers ■ Spirit in workplace ■ Focus on company growth 	<ul style="list-style-type: none"> ■ Question the rules ■ Pragmatic/practical ■ Defined by the PC ■ Join organizations 	<ul style="list-style-type: none"> ■ Argue with the rules ■ Individualistic ■ Defined by the Internet ■ Don't join organizations ■ Multi-task like no other generation

- Public Speaking
- Writing
- Self-Management
- Networking
- Critical Thinking
- Decision Making
- Math
- Research
- Relaxation
- Basic Accounting



- ChE has evolved from industrial chemistry to Unit operations to Chemical Engineering Science (process models using mathematical tools to Product design & Engineering to Biochemical & Biomolecular engineering to Energy & Environment to ...
- Adaptability
- Leadership
- Innovation
- Influence of technology on education
- Changing generation

