E11 – Autonomous Vehicles
Engineering and Computer Science Outlooks
Overview

- Engineering and CS @ HMC
- Jobs Today
- The Best Jobs
- Venues
- Jumping Ship
Why I chose Engineering

Best Parts of Engineering

Worst Parts of Engineering
Engineering @ HMC

- Highlights:
  - MicroPs

http://www.youtube.com/watch?v=4uBzQt8p93M
Engineering @ HMC

- Highlights:
  - E8o
Engineering @ HMC

- Highlights: E8o
Engineering @ HMC

- Highlights:
  - Choice Lab

http://www.youtube.com/watch?v=rX-yrE1iTMU
Why I chose Computer Science

Best Parts of Computer Science

Worst Parts of Computer Science
Computer Science @ HMC

- Highlights:
  - Choice Lab
Computer Science @ HMC

- Highlights: CS 60
Highlights: Neural Networks

\[ [9, 0, -, 4, 2] \]
Computer Science @ HMC

- Highlights: Computer Systems

```
8048fa0 <getbuf>: 8048fa0: 55 8048fa1: 89 e5 8048fa2: 83 ec 24 8048fa3: 8d 45 f4 8048fa4: 50 8048fa5: e8 f5 ff ff
8048fa6: b0 01 00 00 00 8048fa7: c9 8048fa8: c3 8048fa9: 66 90
push %ebp
mov %esp,%ebp
sub $0x24,%esp
lea -0xc(%ebp),%eax
push %eax
call 8048dad <Gets>
mov $0x1,%eax
leave
ret
xchg %ax,%ax
```

`IDIOT.IDIOT.IDIOT.EDU@cs.hmc.edu`

to undisclosed recipients

LKJL;KJLKJ
LKJL;J
AND THEN THERE WAS A QUIZ.
ALL IN AFTERNOON CLASS GOT A 10 BECAUSE THEY SHOWED UP ON TIME!!!

HA HA`
Overview

- Engineering and CS @ HMC
- Jobs Today
- The Best Jobs
- Venues
- Jumping Ship
Best Jobs in America

Top 10 Jobs:
1. Systems Engineer
2. Physician Assistant
3. College Professor
4. Nurse Practitioner
5. IT Project Manager
6. Certified Public Accountant
7. Physical Therapist
8. Computer Security Consultant
9. Intelligence Analyst
10. Sales Director

Key:
- Green: Highest paid jobs
- Red: Highest median salary
- Blue: Most satisfaction
- Yellow: Benefit to society
- Green: Highest job growth
- Pink: Highest two years salary
- Blue: Most security
- Orange: Future growth

Median Salaries (Top 10 Jobs):
1. Systems Engineer: $187,100
2. Physician Assistant: $134,000
3. College Professor: $115,000
4. Nurse Practitioner: $113,000
5. IT Project Manager: $108,700
6. Certified Public Accountant: $100,000
7. Physical Therapist: $100,000
9. Intelligence Analyst: $83,000
10. Sales Director: $82,000

Other Jobs:
- Attorney/Lawyer: $78,000
- Physician/General Practice: $74,000
- Human Resources Manager: $71,000
- Senior Financial Analyst: $70,000
- Physician/Osteopathic: $69,000
- Clinical Psychologist: $67,000
- Psychiatrist: $57,000
- Veterinarian: $58,000

Future Growth:
- Telecommunications, Network Engineer: $56,200
- Securities Trader: $49,000
- Education/Training Consultant: $37,800
- Emergency Room Physician: $240,000
- Product Management Director: $145,000

Note: Salaries are approximate and may vary.
10 hot careers for 2012 - and beyond

By Anne Fisher, contributor

Hiring overall probably won’t pick up much next year, but there are pockets of prosperity even in this job market. Here’s where the most opportunities are now.

FORTUNE -- Strange but true: Despite the fact that unemployment is stuck at around 9%, which translates to about 15 million Americans out of work, nearly 3 million job openings in the U.S. are going unfilled, according to the Bureau of Labor Statistics. Why? The biggest reason is a mismatch between the qualifications employers are looking for and the skills job hunters have.
1. Information technology. When career site Indeed.com recently analyzed millions of job postings on its website, researchers found that the fastest-growing category of keywords — including HTML5, Android, mobile app, and social media — were in IT. And a new survey by tech job site Dice.com bears that out: About 85% of hiring managers said they hope to add tech staff in the first half of 2012. Roughly a quarter of those (27%) said they want to expand their IT headcount by more than 20%.

Openings for software developers who specialize in applications will rise by more than one-third (34%) by 2016, says Best Jobs for the 21st Century, a new book by job market analyst Laurence Shatkin, while companies will hire 20% more computer systems analysts. Rising pay in these fields reflects the surge in demand: The Bureau of Labor Statistics says that developers of systems software, for instance, earn an average of $94,150 per year.
Jobs Today

- CNN article...

4. Engineers. Note to college students who want their pick of job offers when they graduate: Consider majoring in engineering. A whopping 88% of employers in a new poll by the Society for Human Resource Management bemoaned the difficulty of finding enough engineers to hire. Civil engineers are in demand too; Shatkin's analysis of BLS data shows a 24.3% spike ahead in jobs for people who design roads, bridges, and other infrastructure projects (average annual pay: $77,000).
## Engineering vs. Computer Science

### Occupational Distribution of STEM Jobs through 2018

<table>
<thead>
<tr>
<th></th>
<th>Computer Occupations</th>
<th>Engineers &amp; Engineering Technicians</th>
<th>Life &amp; Physical Science Occupations</th>
<th>Architects, Surveyors &amp; Technicians</th>
<th>Mathematical Science Occupations</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Jobs</td>
<td>183,750</td>
<td>75,340</td>
<td>31,210</td>
<td>19,840</td>
<td>9,670</td>
<td>319,820</td>
</tr>
<tr>
<td>% of all STEM jobs</td>
<td>57%</td>
<td>24%</td>
<td>10%</td>
<td>6%</td>
<td>3%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Computer Technicians, Programmers, and Scientists

* Totals may differ slightly due to rounding.
Best Jobs?

1. Biomedical Engineer

Median pay: $79,300
Top pay: $124,000
18-year job growth: 61.7%
Total jobs*: 16,700

What they do all day? Science fiction is a little less fictional in the day-to-day work of biomedical engineers, who design prosthetic limbs and artificial organs or regenerate tissue. They also create drug formulations, develop pharmaceuticals or collect and analyze biological data, among other work. In this field lies the intersection of biology and engineering skills, which helps crack tough problems in medicine and health.

How to get the job? A bachelor's, master's or Ph.D. in biomedical engineering will get prospects in the door, but engineers with more traditional degrees — such as electrical, mechanical and chemical — are also a good fit.

What makes it great? Not only is it one of the highest-paid engineering jobs, it’s a career that gives back to society by helping to improve world health. It’s also highly flexible, with positions in universities, hospitals, labs, industry and regulatory agencies.

What’s the catch? Rapid technological changes mean engineers have to work hard to stay ahead of new developments — so this isn’t the field for those looking to coast through their careers. — Kate Ashton

Quality of life ratings:

<table>
<thead>
<tr>
<th></th>
<th>Personal satisfaction</th>
<th>Low stress</th>
<th>Benefit to society</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Engineer</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>
3. Software Architect

Median pay: $119,000  
Top pay: $182,000  
10-year job growth: 24.0%  
Total jobs*: 3,425,000

What they do all day: Great software architects are designers and diplomats. They create innovative and valuable programs, but they also translate highly technical plans into a vision the C-suite can understand. They are a crucial link between a company's tech unit and management.

How to get the job? Unless one's last name is Gates or Zuckerberg, a computer-related degree is strongly advised. A high-level position requires lots of experience, technical smarts and fluid communication skills.

What makes it great? It's an opportunity to create and shape a company's computer strategy. More responsibility also brings higher pay for a designer who wants to trade a PC screen for the conference room.

What's the catch? Tech teams and management often speak very different languages that can lead to misunderstandings and even flare-ups. Putting our feet on both sides is crucial. —T.Z.

Quality of life ratings:

<table>
<thead>
<tr>
<th></th>
<th>Professional satisfaction</th>
<th>Work-life stress</th>
<th>Benefit to society</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>A</td>
</tr>
</tbody>
</table>
Software Developer

Median pay: $94,200
Top pay: $121,000
16-year job growth: 24.6%
Total jobs*: 3,436,000

What they do all day? From the games in a smartphone to the tools that map a genome, software developers write the programs that run our lives. The work runs across all levels of the process — research, design, writing and testing — and all the way to the final product.

How to get the job? Most developers have some sort of degree in computer science, but it’s a field that welcomes self-starters with practical experience and the right certifications. Check with local colleges to get going.

What makes it great? A developer can fly solo as a freelancer or work for a company as part of a team. And with a technology boom that shows no end in sight, firms are having a hard time filling positions.

What’s the catch? Those positions aren’t always in the U.S. In the search for talent (and low costs), more companies are heading overseas for their development needs. It’s also an ever-evolving field that requires a constant keeping up on what’s new. — T.Z.

Quality of life ratings:

<table>
<thead>
<tr>
<th>Personal satisfaction</th>
<th>Job stress</th>
<th>Benefit to society</th>
<th>Future rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
</tbody>
</table>
Venues

- Startup
- Small High-Tech Company
- Large High-Tech Company
- Academic
- Government
- Graduate School
Venues

- **Startup Companies**
  - E.g. Kiva, DocSpace, Aeryon, Gaming, OBEI, ...
  - Low level of job security
  - Hard work
  - Exciting
  - Large variety of tasks
  - Highly Creative

*Kiva Systems*
Small High Tech

- E.g. RTI, Sterner Automation
- Increased Job security
- Reasonable work level
- Still can be Exciting
- Typically one task, but can see relations with entire company
- Often focus on 1-2 products
Venues

- Large High Tech
  - E.g. Lockheed Martin, Google, 3M, Solutia
  - High level of job security
  - Reasonable work level
  - Much room for lateral movement within co.
  - Typically one task
  - Often difficult to see big picture
Venues

- **Academia**
  - E.g. Harvey Mudd College!
  - Higher job security (with tenure)
  - Unreasonable work level
  - High level of creativity
  - Very flexible
  - Very difficult to obtain
Government

- E.g. DARPA, Navy, CIA, ...
- Higher job security
- Reasonable work level
- Inflexible
- Could be best job ever (but I couldn’t tell you!)

Central Intelligence Agency
Venues

- Graduate School
  - Flexible
  - Low pay
  - Highly Creative
  - Empowering environments
  - Stepping Stone?

Aerospace Robotics Lab – Stanford University

Cussler Research Group – Univ. of Minnesota
Jumping Ship

- Many people transition from their undergraduate education
  - Medicine
  - Law School
  - Wall Street
  - ...

Quansar Haptics