Career Paths
in Computer Engineering

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University of Maryland, College Park
So What Are You Going to Do With Your Life?

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Electrical & Computer Engineering
University of Maryland, College Park
The Scene

OPEN CURTAIN:  Engineer -- talented, motivated, hard-working, comfortable with the college thing, is accosted by Parents, D and M

D:  Hey — we know it’s only Junior Year, but have you got the rest of your life planned out yet?

M:  By the way, we’re very proud of the grades and all, but — again — about your life ...

Engineer:  Aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaagh!
Careers in Engineering

YOUR OPTIONS:
College => Industry
            => Grad School => Industry
            => Research
            => Academics

PATHS I WILL DISCUSS:

•  Industry        B.S. or M.S.***
•  Industry/Research Ph.D.
•  Academics       Ph.D.***

*** Paths I have taken
Big Picture

In Computer (& Electrical) Engineering:

- **Industry**  BS/MS  **DEVELOP**
- **Industry/Research**  PhD  **DESIGN**
- **Academics**  PhD  **RESEARCH TEACH**

**DEVELOP == BUILD**
**DESIGN == JUSTIFY YOUR CHOICES**

*PhD’s are paid to THINK*
*MS’s & BS’s are paid to DO***

*** Mitigated by SIZE of COMPANY***
# Big Picture

<table>
<thead>
<tr>
<th></th>
<th>Industry/BS</th>
<th>Industry/PhD</th>
<th>Academia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary Range (0yrs - 10yrs)</td>
<td>$50K - 100K</td>
<td>$80K - 120K</td>
<td>$70K - 120K (12-month)</td>
</tr>
<tr>
<td>Job Security</td>
<td>OKAY</td>
<td>GOOD</td>
<td>GREAT</td>
</tr>
<tr>
<td>Freedom</td>
<td>LITTLE</td>
<td>SOME</td>
<td>LOTS</td>
</tr>
<tr>
<td>Respect</td>
<td>LOTS</td>
<td>LOTS</td>
<td>LITTLE</td>
</tr>
<tr>
<td>Visibility</td>
<td>NONE</td>
<td>LITTLE</td>
<td>LOTS</td>
</tr>
<tr>
<td>Brief Job Description</td>
<td>DEVELOP</td>
<td>DESIGN</td>
<td>RESEARCH &amp; TEACH</td>
</tr>
<tr>
<td>Perks of the Position</td>
<td>FREE</td>
<td>STOCK</td>
<td>TALKING TO A CAPTIVE AUDIENCE :)</td>
</tr>
</tbody>
</table>
Industry — BS/MS

JOB DESCRIPTION:

- Optimize Previous Designs
- Debug Existing Designs
- Technical Support
- Site Maintenance
- Sales Engineering
- The “D” of “R&D”
Industry — BS/MS

A DAY IN THE LIFE:

- Programming (product development)***
- Testing/Debugging
- Meetings (scheduling)
- Travel to customer sites
- Interacting with customers

*** C, Java, Verilog, VHDL, SPICE, Cadence, etc ... depends on project
WHAT ARE YOU GOING TO DO WITH YOUR LIFE?

Bruce Jacob
University of Maryland

Industry — PhD

JOB DESCRIPTION:

- Design Next-Generation Product
- Design/Develop Highly Complex Products (e.g. CAD tools)
- Long-Range Planning
- Concept Development
- The “R” of “R&D”
Industry — PhD

A DAY IN THE LIFE:

- Programming (experimental)***
- Meetings (brainstorming)
- Writing papers — maybe
- Travel to conferences

*** C, Java, Verilog, VHDL, SPICE, Cadence, etc ... depends on project
Academics — PhD

JOB DESCRIPTION:

- **Research:** Whatever you want (given funding constraints)
- **Teaching:** Whatever is needed
- **Mentoring students**

TWO UNIVERSITY MODELS:

- **Teaching Universities**
- **Research Universities**
Academics — PhD

A DAY IN THE LIFE:

- Writing proposals, papers & talks
- Email
- Programming (experimental)***
- Develop & teach courses
- Travel to conferences

*** C, Java, Verilog, VHDL, SPICE, Cadence, etc ... depends on project
Start-Up Companies ***

- Enter at Any Level
- Flexible Job Description *(room to move around)*
- Flexible Pay Scales *(SMALL possibility of LARGE pay-offs)*
- Collegiate Atmosphere *(working day == noon to 3am, etc.)*
- A Downside: RISK FACTOR *(not advised for those w/ mortgage, kids, etc. — mitigated by size & age of the start-up)*

*** Includes grant-funded “mercenaries”
# Start-Up Companies

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<tbody>
<tr>
<td><strong>Salary Range</strong></td>
<td>$40K - 100K or more</td>
</tr>
<tr>
<td><strong>Job Security</strong></td>
<td>NONE (... to LOTS)</td>
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<td><strong>Freedom</strong></td>
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<td><strong>Visibility</strong></td>
<td>NONE</td>
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<tr>
<td><strong>Brief Job Description</strong></td>
<td>DESIGN, BUILD, TEST, MAINTAIN, WHATEVER ...</td>
</tr>
<tr>
<td><strong>Perks of the Position</strong></td>
<td>COOL ATMOSPHERE, INTRIGUING PROBLEMS, STOCK OPTIONS (maybe)</td>
</tr>
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Perhaps Best of Both Worlds?
Important Note on Timing

MY PATH:
1988 Graduated College, Started 1st Job (as High-School Math Teacher)
1989 Joined One Start-Up (Empl. #65)
1990 ...
1991 Joined Another Start-Up (Empl. #2)
1992 Entered Grad School
1993 ...
1994 ...
1995 ...
1996 ...
1997 Joined Faculty at Maryland

POINT: Never too late to change your mind
Reiteration/Conclusion

You do NOT have to figure it out NOW

Where you are 10 years from now ≠ where you THINK you will be 10 years from now

No decisions are binding
(can always change paths)

STAY CURRENT IN FIELD ... makes changing directions easy

Enjoy yourself
Question & Answer

EXAMPLES:

• *What is grad school like?*
• *Start-up vs. academia?*
• *MS vs. BS -- is there no difference?*
• *Sorry -- I was sleeping -- mercenaries?*
• *What was that you said about jobs?*

More Info -- http://www.ece.umd.edu/~blj