Santa Clara Valley Medical Center: My Fall 2014 Internship

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Internships: Where to begin?

- Where are opportunities available?
- How are interviews structured?
- What do clinical trial statistics interns do?
The search

- **Challenge – Reaching the hidden job market:** Most positions aren’t posted, but found by networking. Advertised openings are oversubscribed.

- **Tip 1: Apply to SCVMC!** Our group is seeking interested student interns. I found the position from the department after having applied elsewhere.

- **Tip 2: Use conference placement services:** Did you know the American Statistical Association, Conference on Statistical Practice, INFORMS, and Joint Statistical Meetings let you search jobs and post resumes?
  
  - **Why use this approach?**
    1. Employers respond
    2. Networking for statistics jobs
  
  - **The downside:**
    1. Posting fees
    2. Many jobs outside California

  **What I like:**
  
  - 36 people viewed my resume at JSM. Some contacted me.
  
  - One interviewer said JSM is a good place to find statisticians
The search

• **Tip 3: Try multiple standard resources**

<table>
<thead>
<tr>
<th>Approach</th>
<th>Resources</th>
</tr>
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<tbody>
<tr>
<td>Networking</td>
<td><strong>Campus:</strong> Classmates, internship talks, job fairs, professors</td>
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<td></td>
<td><strong>Area groups:</strong> ASA (join their sections and Young Professionals Group), BAD Math/BAMBA meets, Bay Area R and SAS Users Groups</td>
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<td>Job boards</td>
<td><strong>Campus:</strong> Internship mailing list, Nacelink, SpartaJobs</td>
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<td></td>
<td><strong>General:</strong> CalJOBS, Craigslist, Glassdoor, Indeed, LinkedIn</td>
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<td></td>
<td><strong>Internships:</strong> Internbound, Internmatch</td>
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<td></td>
<td><strong>Technical:</strong> Magazines/journals (<em>Amstat News</em>), Icrunchdata</td>
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The search

• **Tip 4: Consider finance, health, or IT firms**

**Statisticians by sector**

**Source:** BLS

**Great reading:** *A Career in Statistics: Beyond the Numbers* (Hahn and Doganksoy)
Interviews

• The fit interview
  – Company
  – Resume
  – Teamwork
  – Goals/why this job?
  – My questions

• The technical interview
  – p-values
  – Regression (linear, logistic): Assumptions, model adequacy/residual plots, nonconstant variance, $R^2$
  – Data mining: Supervised vs unsupervised algorithms

What surprised me: Interviews were often unstructured. We spent more time discussing the firm and less time discussing my qualifications than expected.

One reading: Maybe firms assume we know the work and look for fit.
Projects

- **First project:** Revise a paper to satisfy three reviewers’ comments
- **Problem:** Does walking reduce fatigue after traumatic brain injury?

**To quote:** (1) “Had [certain specified] differences been adjusted in the statistical analysis (AVCOVA rather than ANOVA), the results may have been quite different.” (2) “Re-analyze the data so that the primary analyses focus on walking versus nutrition [our control].”

- **Approach:**

<table>
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<tr>
<th>Step</th>
<th>Thought process</th>
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<tr>
<td>Run ANCOVA</td>
<td>Choose covariates from ten candidates using stepwise selection. Rule out multicollinearity.</td>
</tr>
<tr>
<td>Run contrasts</td>
<td>If simple contrasts (time * order, baseline to the end of treatment) have $p &lt; 0.05$, conclude walking and nutrition effects are different.</td>
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Projects

• **Second project:** Prepare a power study for a grant application

• **Problem:** What sample size gives 90% power in a trial of Ekso™ exoskeletons?

  **To quote:** “We intend to utilize a single-blind, multiple-baseline, randomized, pretest and posttest, control group design to enroll xxx study participants.”

• **Approach:**

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<td>Find a model</td>
<td>Mixed ANOVA captures pre-post test repeated measures</td>
</tr>
<tr>
<td>Estimate effect sizes</td>
<td>Find data from pilot studies or literature reviews. Compute Cohen’s f for each primary outcome variable.</td>
</tr>
<tr>
<td>Compute sample sizes</td>
<td>Feed $\alpha$, Cohen’s f, and power into calculators like GPower (under the hood: hypothesis testing, noncentral F distribution)</td>
</tr>
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Projects

Device of the future?
• **Ekso Bionics™**: Founded 2005 out of Berkeley’s Robotics and Human Engineering Laboratory

• **Not for amateurs**: *Time’s* top 50 inventions, *Wired’s* Top 10, 2010! But costs $100K+, trials underway.
Class learning

Math 261B
Analysis of (co)variance

Math 164
Power

Math 161B
SPSS
On-the-job learning

New designs
- Crossover studies
- Multiple baselines

Choosing models
- ANCOVA/ANOVA

Communication
- Writing reports
- Etiquette/events
Contact information

- **Internships open at the Rehabilitation Center:** Please see Dr. Bremer to apply

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<th>Research area</th>
<th>Available projects</th>
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<td>Spinal cord injury: Challenges</td>
<td>Communication, depression, and nerve issues</td>
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<tr>
<td>Spinal cord injury: Treatments</td>
<td>Drug-based, myofascial, and tai chi</td>
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- **Rehabilitation Center site:** scvmcrehab.org
- **Volunteer site:** scvmc.org/services/Pages/Volunteer-Services.aspx