Georgia Day

Statistical Consulting

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Acknowledgements

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1. Definition

A **statistical consultant** provides a range of services to clients including statistical *advice*, *analysis* and *training*. Clients can come from a wide variety of subject areas including business, medicine, environment and government, but they all have one thing in common; they wish to collect and analyze data to make *evidence-based decisions*. 
Process (1)

1. The start of a typical project will often involve **liaising with a client to define its scope**. For example, does the client require advice so that they can carry out analysis themselves or would they like you to analyze their data for them?
Process (2)

2. It is common to write up a detailed proposal of the work including what data will be required, the methods that will be used, the deliverables and the timeline for completion. Of course, the consultant will discuss with the client about the pay-rates.
3. The consultant will carry out the analysis, advice or training in the agreed time frame. **Effective communication** is an essential part of the role and a consultant must ensure that any client *reports* or *presentations* are clear, concise and intelligible and do not contain any unnecessary technical detail.
Remarks

• Statistical consultants often provide bespoke statistical analyses tailored specifically to the requirements of their clients. This means that the techniques used will often differ from one project to another (especially when working with clients from a variety of different sectors). As it is unlikely that all of these techniques will have been covered by undergraduate and postgraduate studies, “on the job” learning can sometimes be necessary.
2. A Story from My Consulting Experience

- Health-Care Insurance Project
- Developed Problem-solving Methods
- Delivered A Computer System that Includes Implementation of the Methods
- Tested in Real-life Operations (patent application)
- Company Grown Significantly
- Company Sold in 12 Million Dollars
3. Consulting Leads to Research

• **University Consulting**
  – External (pay-based projects)
  – Internal (“free consulting”)

• **Real-life Problems with Data**
  – Example: Bivariate Zero-Inflated Poisson Data Model

• **Need Experience of Linking Problems to Research Issues**
  – Example: Wavelet-based Data Reduction for Fault Classification and Monitoring

• **Require Follow-up Studies for Publications**
  – Examples: Initial Experiment, Layer-of-Experiments
4. External Funding

• Industry Funded Projects
  – Examples: Notel, Nortel-Wireless, ...

• NSF Industry-University Training Projects

• One Multi-Million VIGRE Project

• Follow-up Studies led to NSF Research Projects
  – Examples: Degradation Studies, Wavelet-based Data Reduction, Initial Experiment, ...

• Inspire One NSF Engineering Education Project
5. Student Involvement

• 4 – 15 students working for various companies in the NC-RTP area for company “in-house” consulting projects
  – These opportunities generate many interesting problems and real-life data sets
• Ph.D. students have been benefited from the problems/data and also funds generated from these projects
  – Sometimes, they served as consultants for BS and MS students working on company projects.
6. Classroom Teaching

• Consulting Problems and Data have been used in Teaching Courses such as Data Mining, Business Analytics and Statistical Modeling (Regression)

• Consulting Experience Inspire Course Development
  – Example: Data Mining and Business Analytics

• GT-ISyE Undergraduate Senior Design Teaching

• Clients Come to Classroom for Presentation
7. Training for Consulting Career

- GT-ISyE UG Senior Design Courses
- Projects in Courses such as Quality Methods, Data Mining and Business Analytics
- Statistics Departments Have Consulting Courses
  - Teach how to communicate with clients in problem formulation, project proposal preparation, project study (including data analysis basics), report and presentation
- Some Programs Have “Statistics Center”
8. Conclusion

• Consulting is a rewarding activity in various university operations
  – Research Problems, Funding Opportunities, Teaching Materials, Student Training, ...

• Need to Balance Between Consulting and Other Activities (e.g., Teaching and Research)

• Due to the fast growth of Analytics Programs in GT and GT-ISyE, statistical consulting will continue to be in high demand.
Q & As

Thank you!