Development of a Research Statement

Prof. Armand R. Tanguay, Jr.

University of Southern California
Departments of Electrical Engineering, Materials Science, and Biomedical Engineering; Neuroscience Graduate Program

National Science Foundation
Engineering Research Center on Biomimetic MicroElectronic Systems
Definition of a Research Statement

- **What *is* a research statement?**
  - Articulation of *your research field*
    - Key directions
    - Promising lines of inquiry
  - Articulation of *your own research*
    - Motivation
    - Long term goals
    - Short term goals
    - Key approaches
    - Results to date
    - Specific research proposals
  - The *importance* of the field, and of your research to it
The Key Elements of a Research Statement. I

- **Content**
  - Clear Statement of the Problem (Set)
    - Broad and inclusive
    - Is this a single issue, or a potential new field?
  - Summary of the State of the Art
  - Discussion of Research Methodologies and Approaches
    - Theoretical
    - Experimental
    - Computational or Numerical Simulation
The Key Elements of a Research Statement. II

- **Content (cont.)**
  - Discussion of **Research Methodologies and Approaches** (cont.)
    - Observational
    - Cataloguing
    - Design-Oriented
    - Hypothesis-Driven (*e.g.*, NIH)
    - Area-Defining (New intellectual territory)
  - **Uniqueness** of the Problem and Approach
  - **Progress to Date**
    - Summary of Ph.D. Thesis
    - Summary of major publications
The Key Elements of a Research Statement. III

- Content (cont.)
  - Impact on the State of the Art to Date
  - Proposed Research Initiatives
    - Near Term
    - Mid Term
    - Far Term
  - The End Goals
    - If all of this works out, what can one envision as the result?
  - Incorporation of this Research in the Classroom
    - Topical courses (especially in new and emerging areas)
    - Exploration of research methodologies
    - Problem statements and related research projects
Stating Your Teaching Philosophy

Prof. Armand R. Tanguay, Jr.

University of Southern California
Departments of Electrical Engineering, Materials Science, and Biomedical Engineering; Neuroscience Graduate Program

National Science Foundation Engineering Research Center on Biomimetic MicroElectronic Systems
Statement of Teaching Philosophy: Outline

- The Statement of Teaching Philosophy
  - Purpose
  - Content (Key components)
  - Issues to consider
Development of a Research Statement; Stating Your Teaching Philosophy

Statement of Teaching Philosophy: Purpose

- **Key Component of a Teaching Portfolio**
  - Provides a natural organization scheme for the teaching portfolio
  - In large part determines the content of the teaching portfolio
  - Support for key statements

- **Key to Establishment of Individual Teaching Goals and Objectives**
  - Opportunity to focus on those aspects of teaching that you value most highly
  - Opportunity to develop your own individual set of teaching approaches and skills

- **Required Document for Employment, Promotion, Awards**
  - A living document, evolving over time
Statement of Teaching Philosophy: Content.  I

- **Who** (are you, as a teacher, and who do you want your students to become)?
- **What** (are your goals, objectives, values, interests, approaches)?
- **When** (have you accomplished key teaching activities)?
- **Where** (have you been influenced, and from where have you learned valuable lessons)?
  - Special teachers, significant quotes, unusual classes
- **Why** (do you want to teach in the first place)?
- **How** (do you propose to grow as a first-rate teacher/educator)?
Statement of Teaching Philosophy: Content. II

- Order of key components
  - Goals and objectives (values)
    - Personal goals as a teacher
    - Goals for your students
  - Teaching methods and approaches
    - Unique to you; reflect fundamental values
    - Specific to your discipline
  - Methods of assessment
    - Self, student
  - Path to improvement
  - New ideas
    - Vehicles for trying them out
Statement of Teaching Philosophy: Issues to Consider.  I

- A Teaching Philosophy Statement need not be comprehensive
  - But it had better be interesting!

- What is the purpose of any education?
  - Purpose/value of a teacher in the process

- Something special that you have been taught by one of your own best teachers
  - Or even worst!

- Something special that you have learned from your own teaching experience
  - An unforgettable lesson
Statement of Teaching Philosophy: Issues to Consider. II

- **Fundamental Values**
  - Creativity
  - Inventiveness
  - Reflective thinking
  - Analytical skills
  - Breadth of knowledge
  - Depth of knowledge *in one or more specific areas*
  - Individual achievement
  - Ability to collaborate *and work in groups effectively*
  - Challenge *(personal growth, ability to overcome)*
  - Knowledge
  - Independence of thought and action
  - Leadership
  - Decision making ability
  - Cultural sensitivity
Statement of Teaching Philosophy: Issues to Consider. III

Unique Teaching Methods and Approaches (Examples)

- Infection vs. injection
- Programmed failure
- Scientific Method vs. the Scientific Approach
  - Well-formulated problems (hypotheses)
- Art of scientific presentation
- Incorporation of design problems
- Ability to deal with ambiguity
- Development of creativity
- Development of leadership skills
  - Research group structure and responsibilities
Statement of Teaching Philosophy: Issues to Consider. IV

- **Intimate Coupling of Teaching and Research**
  - Teaching research skills
  - Researching teaching methods and approaches
  - Laboratory experiences
  - Critical literature searches

- **Unique Subject Matter**
  - *e.g.*, Chaos, Fractals, and Complexity Theory

- **Unique Approach to Traditional Subject Matter**
  - *e.g.*, EE 105, Introduction to Electrical Engineering
    - Systems perspective
    - Top down instead of bottom up
    - Disassembly of computers, devices in class
Statement of Teaching Philosophy: Issues to Consider. V

- **Interdisciplinary Teaching**
  - Shows academic breadth
  - Major goal of many universities and colleges in 2008

- **Collaborative (Team) Teaching**
  - Cooperative nature; differences in perspective

- **Emphasis Matched to the Institution**
  - Research universities
    - Departmental, disciplinary differences
  - Universities
  - Selective colleges
  - Liberal arts colleges (scientists, mathematicians)
  - Community colleges
Statement of Teaching Philosophy: Issues to Consider. VI

- There is no one formula
  - Literally thousands of variants
  - Many degrees of freedom

- This is *your* teaching philosophy
  - Not anyone elses!

- The Key to Success
  - Write what you believe
  - Follow the consequences!