

The Software Engineering Ph.D. Program at Carnegie Mellon

SE Ph.D. Immigration Course Overview

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Software Engineering at Carnegie Mellon

Software engineering is the branch of computer science that creates practical, cost-effective solutions to computing and information processing problems, preferentially by applying scientific knowledge, developing software systems in the service of mankind

- from “Software Engineering for the 21st Century: A basis for rethinking the curriculum”
by the CMU SE Faculty (Mary Shaw, editor).
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The Software Engineering Ph.D. Program

- Our goal: to help you become future leaders of the SE field
 - **Researchers** developing SE tools and techniques that transform the practice of SE and open new fields of inquiry
 - **Educators** who train the next generation of SE students
 - **Practitioners** who drive innovation within their companies
 - Any of these roles can be played in multiple settings
 - Research and teaching universities
 - Government laboratories or leadership
 - Corporate labs, development, or management
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- We believe a **community** is the best way to provide this help
 - Your advisor, fellow students, other faculty, and the ISR staff
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SE Ph.D. Program Elements (1)

- Course requirements (7)
 - 17-808: Software Engineering Research
 - SYM: Symbolic mathematics and analysis
 - ENG: Software systems design and engineering
 - SOC: Software and issues in society, business, or public policy
 - BEH: Behavioral science research methods
 - 2 Ph.D. level electives
 - Practicum
 - An issue-focused reflection on personal SE experience, *or*
 - An empirical study of SE practice
 - Teaching (2)
 - Assist with teaching two courses
 - One introductory and one advanced
 - Non-native English speakers take International TA test
 - Spend 15 hours/semester in Intercultural Communication Center classes until Pass
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SE Ph.D. Program Elements (2)

- Speaking skill
 - Give 3 talks per year, 2+ in software research seminar (SSSG)
 - Attend and provide feedback to other SSSG speakers
 - Sustained excellence → pass → continue practice!
 - Writing skill
 - Write a high-quality scholarly document
 - Evaluated by 2 faculty, 1 Ph.D. student
 - Thesis
 - A significant piece of original research in software engineering
 - Committee: Advisor + 1 ISR faculty + 1 SCS faculty + 1 external
 - Proposal: describe topic, significance, plan
 - Defense: present thesis contributions publicly
 - Volunteer and contribute to the community!
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Typical Program Sequence

COMPONENT	INTENSITY	COMPLETION TIME
Practicum	1/4 time for 1 semester	By the end of year 2
Required courses	each 1/4 time for 1 semester	By the end of year 3
Writing skills	variable	By the end of year 3
Speaking skills	SSSG	By the end of year 4
Teaching	each 1/2 time for 1 semester	By the end of year 4
Thesis proposal	1/2 time	By the end of year 4
Thesis	full time	By the end of year 5 (or 6)

- Notes
 - Every student is different—exact schedules vary substantially
 - You should spend $\geq 1/2$ time on research every semester
 - Volunteering and speaking continue through the whole program
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What you can expect of us

- Advising
 - The most important relationship you will have
 - Matched in early October
 - View as a long-term commitment
 - Free to change if needed
 - Academic guidance, especially in research
 - Regular feedback
 - From your advisor, often on a weekly basis
 - Each semester from faculty after “Black Friday” meeting
 - Financial support
 - All students in good standing receive free tuition and a stipend
 - A supportive community!
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The Ph.D. is a New World

- Research is your #1 job!
 - Start immediately, upon advisor match (or earlier)
 - Make progress each semester
 - Course grades (mostly) don't matter: learning does
 - B is the passing grade in graduate courses
 - Nature of the work differs
 - You will be given ill-defined problems, and have to define them
 - Critical thinking and interpretation dominate fact-finding
 - Much of the feedback you get will be informal
 - Responsibility for your progress is yours
 - Goals are long-term and high-level
 - Take initiative for your own learning, address your weaknesses
 - Your advisor and the community is there to help – we believe in you!
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What you should do first

- Attend the immigration course
 - All faculty meetings in ISR – even if you know your advisor
 - Selected talks from other departments. E.g. CSD:
<http://www.cs.cmu.edu/~./csd-ic/>
 - Find an advisor
 - Meet with faculty who share your interests
 - Start immediately, and expect multiple interactions
 - Learn more about the program
 - SE Ph.D. website and wiki: <http://isri.cmu.edu/education/se-phd/>
 - SE Ph.D. program document
<http://isri.cmu.edu/education/se-phd/plan/se-phd-program-plan.pdf>
 - Take 15-808
 - Introduces SE research from ISR's point of view
 - Take another star course
 - Ask potential advisors for recommendations; also other students
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Critical People to Know



Prof. Jonathan Aldrich
SE Ph.D. Program Director



Connie Herold
SE Ph.D. Program Administrator



Prof. Jim Herbsleb
SE Ph.D. Ombudsman



Prof. David Garlan
TA Czar



Prof. Bill Scherlis
Head of ISR



Chris Dalansky
ISR Systems Manager
