

# General Advice on CSE Research\*

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\* compiled from many sources



# What is Research

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- Systematic Study or Inquiry
- Leading to new knowledge or theory, or creation of a new artifact, process, etc.
- Goal of research is to advance a field of study or inquiry



# CISE Research Areas\*

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- Computing & Communication Foundations (CCF)
- Computer & Network Systems (CNS)
- Information & Intelligent Systems (IIS)
- Cross-Cutting Disciplines

\* according to [www.cise.nsf.gov](http://www.cise.nsf.gov)



# Faculty Research Activities

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- Perform research
- Publish journal/conference papers
- Speak at conferences and other institutions
- Secure external research funding
- Manage research groups



# Faculty Service Activities

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- Serve as reviewer of papers, proposals
- Serve on conference committees
- Serve on journal editorial boards
- Serve on national boards and panels



# How to do Research

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- Develop an interest in an area
- Identify a research advisor
- Take advanced courses/seminars
- Write down your ideas
- Discuss with advisor and peers
- Make research group presentations
- Write and submit papers to conferences and journals
- Attend conferences and workshops



# Good Research Problem

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- Important (and interesting)
- Related to other problems
- Not easily solved
- Can be solved
- Can be solved by you
- Leads to new research



# Outline of Research Proposal

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- Problem and its Significance
- Related Research
- Proposed Approach to Problem
- Results Obtained to Date
- Remaining Research
- Expected Contributions



# Some Grand Challenges

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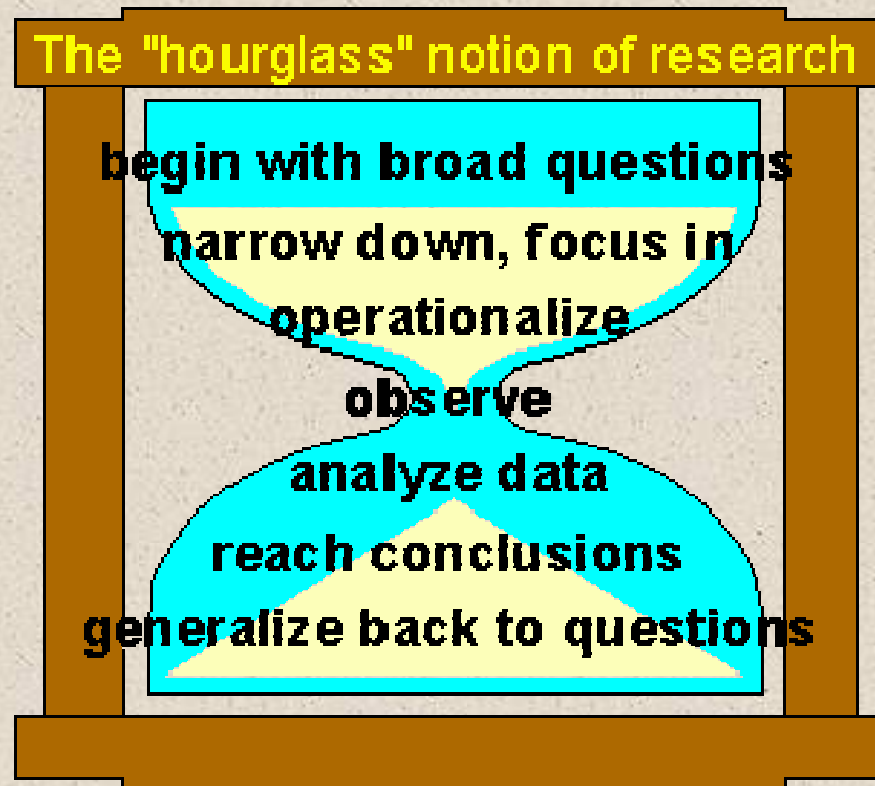
- $P = NP?$
- Build intelligent machines
- Build secure computer systems
- ...

Grand challenges provide high-level motivation for one's research. They involve many research problems, often requiring multidisciplinary approach.



# The Hourglass Model\*

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\* <http://www.socialresearchmethods.net/kb/strucres.htm>



# Qualities of a Good Researcher

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- Logical Thinking
- Ability to Abstract
- Creative, Innovative
- Well-informed
- Communication Skills
- Passionate
- Perseverance
- Take success/failure in stride



# Qualities of a Good Advisor

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- Has research interests in common with you
- Has a national or international reputation
- Has directed students in the past
- Has a reputation as fair and reasonable
- Has an active research group
- Has grant support for research
- Is someone you like and admire



# Resources

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- Research Advisor
- Texts, research monographs
- Journals, conference proceedings
- Internet websites (reputable ones)
- Advice on Research and Writing:

<http://www-2.cs.cmu.edu/afs/cs.cmu.edu/user/mleone/web/how-to.html>