Research in the Design and Semantics of Programming and Specification Systems

Gary T. Leavens

Computer Science, Iowa State Univ.

http://www.cs.iastate.edu/~leavens

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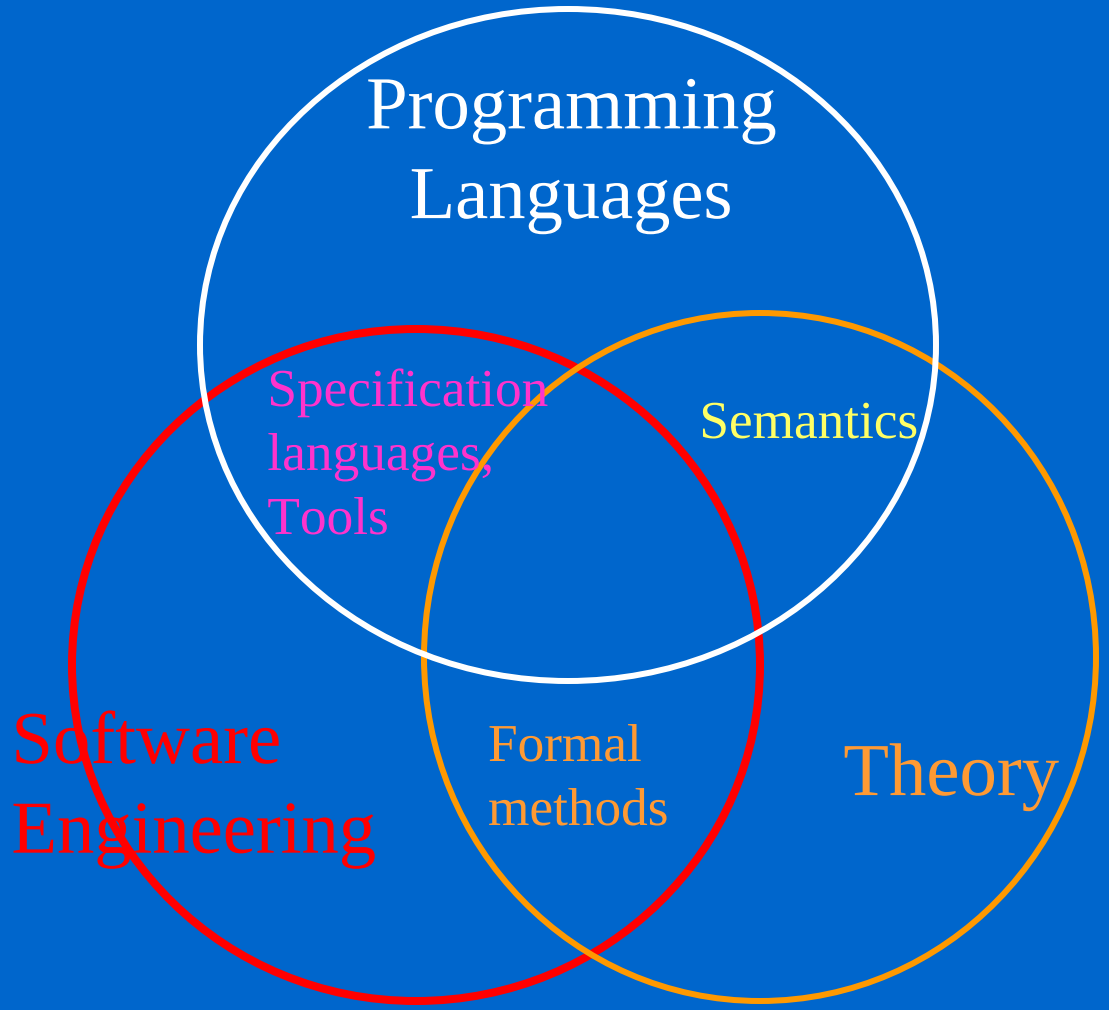
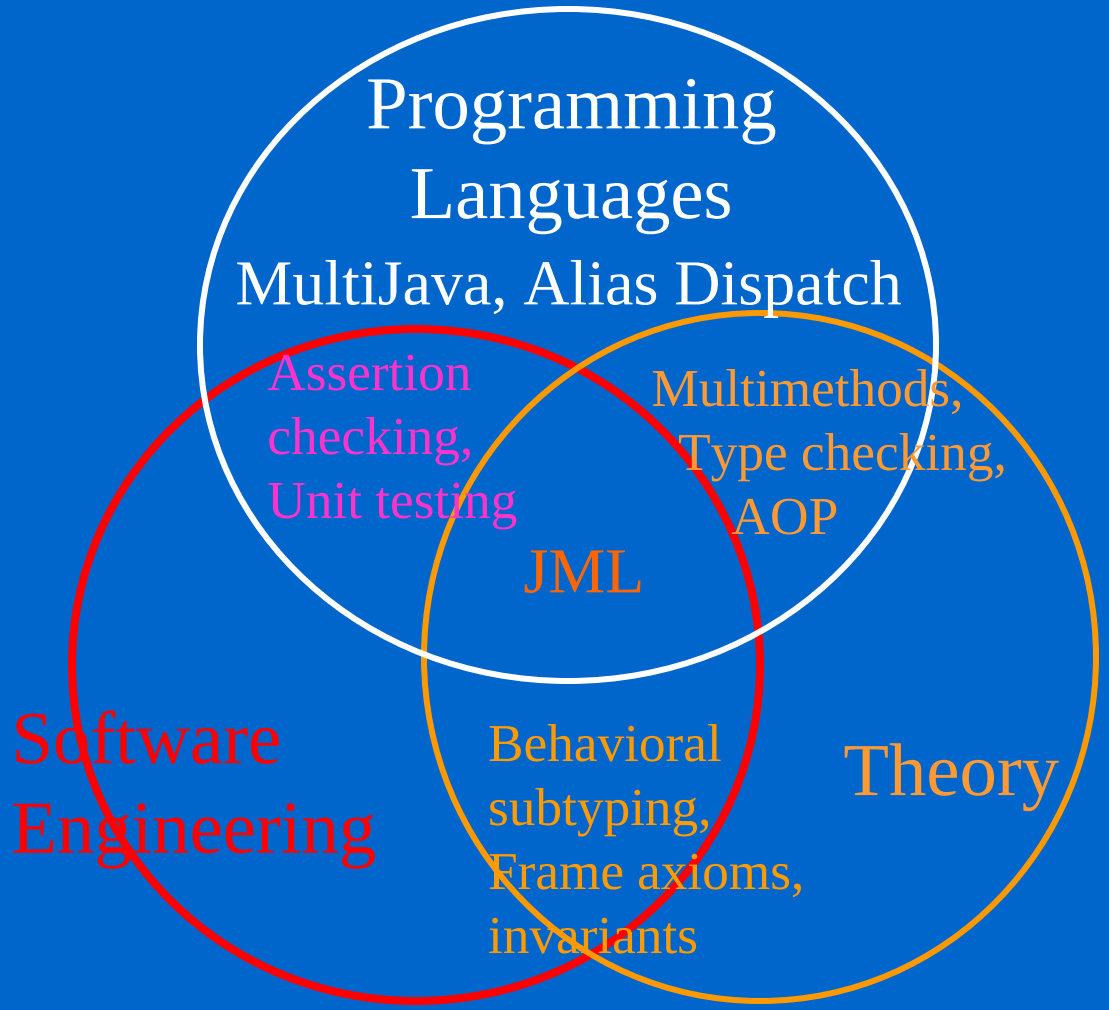
Vita

- Professor at ISU (1989 - present)
- Ph. D. Mass. Institute of Technology (1989)
- Member of Technical Staff, Bell Labs (1979-82)

Research Areas



Research Projects Overview



Further Reading

- JML: jmlspecs.org
- MultiJava: multijava.org
- AOP: aosd.net
- General: www.cs.iastate.edu/~leavens

Master's Topics

- Make a strictly limited contribution
  - implementation of new ideas
  - evidence to support or refute a theory
  - work out details in some grand scheme
  - applies ideas of others in new ways
  - attacks a "real world" problem

Current Open Topics

- Specify a Java framework, and critique JML
- Tools for JML:
  - Recording specifications in .class files
  - Checking performance (time and space)
  - JML support in Eclipse
- Extensions of JML (concurrency, …)
- Unit analysis extension to JML

Ph.D. Topics

- Should make a difference (however small)
  - opens area
  - provides unifying framework
  - contradicts or validates existing theory
  - demonstrates principles for ambitious programs
  - derives superior algorithms
  - new tools

Current Topics

- Specification and verification for AOP
- Combine AOP and multimethods
- Case study of JML for JML tools in Eclipse
- Behavioral subclassing, refinement in JML
- Specification and verification for component-based systems or multimethods
- Invent your own!

Should you do a Ph.D.?

- No.
  - If you want money, prestige, power, etc.
  - Several years of torture.
  - Not much more, maybe less money.
- Yes if you want to do ***research*** in CS.
  - Best way to develop as a researcher.
  - Or if you want to teach at a University.

Grants

- Current (NSF):
  - More Modular Reasoning for AOP
  - Behavioral Subclassing (with David Naumann)
- Pending:
  - Java in Space (with IBM, NASA Ames, JPL, Clemson, UTEP)
  - Checking time and Space in JML

Final Thoughts

- If you're interested in my areas, take/TA:
  - programming languages (342, 541, 641).
  - tools (540, 555, 556).
  - software engineering (362, 411, 512, 515).
  - discrete math (universal algebra, logic).
- Come and see me if you want to discuss research topics for Master's or Ph.D.