

Designing and Presenting Programming Languages in the Broader Research Community

A Case Study of Three Domain-Specific Languages

EECS 590
27. November 2017

Assigned Readings: Spend most of your time on the RAPID paper, but be prepared to discuss all three papers. Pay particular attention to each paper's structure and high-level concepts.

- Angstadt, Weimer, and Skadron's *RAPID Programming of Pattern-Recognition Processors*, ASPLOS '16 (<https://doi.org/10.1145/2872362.2872393>)
- Hnat, et al.'s *MacroLab: A Vector-based Macroprogramming Framework for Cyber-Physical Systems*, SenSys '08 (<https://doi.org/10.1145/1460412.1460435>)
- Regan-Kelley et al.'s *Decoupling algorithms from schedules for easy optimization of image processing pipelines*, SIGGRAPH '12 (<https://doi.org/10.1145/2185520.2185528>)

Discussion Preparation: For each paper, be able to answer the following questions:

1. Who is the audience of this paper?
2. What is the hardware target for this programming language?
3. What is the problem being addressed?
4. Why are current programming techniques not good enough? Why do we need a new language?
5. What are the primary contributions of the paper (according to the authors)?
6. What features (e.g. keywords, data structures, etc.) are unique to this language? How many are there?
7. To what extent is the the syntax and/or semantics of this language different from well-known, general-purpose programming languages?
8. How do the authors introduce and describe language features? Are any techniques discussed previously in class employed?
9. What techniques (at a high level) are used to produce efficient executables on the target hardware?
10. Is there a run-time system? What is its purpose?
11. How is the language evaluated? What metrics are used, and what do they measure?