Curriculum Vitae

Frederick Mattsson Smith

Education

- Ph.D. candidate, Cornell University, Computer Science, 1995-present
  Greg Morrisett and Dexter Kozen, advisors. Math Minor. GPA: 4.0
- M.S., Cornell University, Computer Science, 1999
- B.A., Vanderbilt University, Math & Physics, 1995
  summa cum laude, GPA: 3.9

Research & Teaching Experience

- Research Assistant — 1997-present
  Researched type systems and optimization techniques for run-time code generation (RTCG). Built an optimizing and certifying compiler supporting RTCG. Evaluated the compiler's performance with micro-benchmarks, an instruction set simulator and a ray-tracer.
- Programming Contest Organizer — Summer 2000
  Developed the reference implementation for the International Conference on Functional Programming (ICFP) contest, and answered questions from contestants.
- Consultant — summer 1999-2000
  Developed Hancock, a domain-specific language for processing large volumes of data, at AT&T labs. Participated both in the language design, and compiler implementation. (Worked part-time after the summer of 1999.) (with Kathleen Fisher and Anne Rogers)
- Instructor — fall 1998
  Designed and taught an intensive 4 week course (*Introduction to C*) to 25 students.
- Teaching Assistant — fall 1997
  Graded assignments for the course *Algorithms and Data Structures*. Developed the class project.
- Research Assistant (supported by NSF) — 1996-1997
  Developed and evaluated a new variant of the mostly-copying garbage collection algorithm. (with Greg Morrisett)

- Research Assistant (supported by NSF) summer 1996
  Proved completeness and decidability for Kleene Algebra with Tests. (with Dexter Kozen)

Refereed Publications

1. *Compiling for Run-time Code Generation*
   Submitted for publication to JFP SAIG.
   Frederick Smith, Dan Grossman, Greg Morrisett, Luke Hornof, and Trevor Jim

2. *Hancock: A Language for Extracting Signatures from Data Streams*
   Proc. of the Sixth ACM International Conference on Knowledge Discovery and Data Mining (SIGKDD), Boston, MA, August 2000, 9-17. (**Awarded Best Paper**)
   Corinna Cortes, Kathleen Fisher, Daryl Pregibon, Anne Rogers, and Frederick Smith

3. *Alias Types*
   European Symposium on Programming (ESOP '00), Berlin, Germany, October 2000, 366-381.
   Frederick Smith, David Walker, and Greg Morrisett

4. *Hancock: A Language for Processing Very Large Scale Data*
   USENIX 2nd Conference on Domain-Specific Languages 1999, 163-176.
   Dan Bonachea, Anne Rogers, Kathleen Fisher, and Frederick Smith

5. *Comparing Mostly-Copying and Mark-Sweep Conservative Collection*
   Proc. of the International Symposium on Memory Management (ISMM '98), Vancouver, British Columbia, October 1998, 68-78.
   Frederick Smith and Greg Morrisett

6. *Kleene Algebra with Tests: Completeness and Decidability*
   Proc. of the 10th International Workshop on Computer Science Logic (CSL '96), ed D. van Dalen and M. Bezem, Utrecht, Netherlands, Springer-Verlag Lecture Notes in Computer Science, vol. 1258, September 1996, 244-259.
   Dexter Kozen and Frederick Smith

Honors & Awards

- Best Paper Award SIGKDD 2000

- National Science Foundation Fellowship (1995-1998)
- Phi Beta Kappa honor society

Software Released

- MCC: a mostly-copying garbage collector. MCC provides high performance memory management for compilers targetting C and seamless integration with legacy C code. The prototype compiler for the advanced object-oriented language Moby uses a collector based on MCC.
- `hcc`: a compiler for the domain-specific language Hancock. Hancock is designed for processing large volumes of data, and is used within AT&T for the purpose of detecting telephone fraud. `hcc` can be freely downloaded for non-commercial use.
- Cyclone: an optimizing compiler for a safe C-like language supporting RTCG. The Cyclone compiler produces Typed Assembly Language(TAL) which can be checked for type-safety. Cyclone is available as part of the TAL distribution.

Personal Information

- Citizenship: USA
- Languages: English, Swedish, Portuguese, and some Japanese.

References

- Greg Morrisett (jgm@cs.cornell.edu)
- Dexter Kozen (kozen@cs.cornell.edu)
- Anne Rogers (amr@research.att.com)
- Kathleen Fisher (kfisher@research.att.com)

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