University of Virginia

Facts

• Founded by Thomas Jefferson in 1819
• Among the top 25 schools
• Total number of faculties 2,102
• Undergrad enrollment (fall 06): 13,435
• Graduate enrollment (Fall 06): 6,351

Research Projects

• National compiler Infrastructure/Zephyr - Jack Davidson
  – Generate intermediate code from abstract syntax desc. Language
  – Translation from inter. language to machine code uses description of instruction.
  – Optimization

• Brainpower for Business: resources and solutions for business - Alf Weaver
  – Provides business assistance to start-up companies

• Lava: The Laboratory for Computer Architecture at Virginia - Kevin Skadron
  – ILP, branch prediction, memory hierarchy, arch. for embedded env., simulation

• Legion: World-wide Virtual Computer - Andrew Grimshaw & Marty Humphrey
  – Test bed for application with large degree of parallelism and complex physical sys. (since 1993)

• Survivability Architectures - John Knight, Kevin Sullivan & John Mchugh
  – Developing a s/w framework to ensure a particular infrastructure requirement of reliability, availability, security and human safety

• Isotach: Concurrency Control without Locks or Barriers - Paul Reynolds
  – IPC in distributed or parallel computing using logical time system.

• Package-oriented Programming (POP) - Kevin Sullivan
  – Investigating the reuse and integration of very large-scale components

• Infotech: Info. Tech. for Mobile and Web-based Systems - Sang Son
  – QoS, security, data consistency in mobile envr., web-based system.

• Holst - Hierarchical Loadable Schedulers - Jack Stankovic
  – Arch. that allows OS to schedule conventional and real-time task with diverse requirement

• LCLint: Annotation-Assisted Static Checking - David Evans
  – Using user defined annotation to check the correctness of code

• Feedback Control Real-time Scheduling - Jack Stankovic, Sang Son, Gang tao, & Tarek Abdelzaher
  – Continuously adjust the scheduler to maintain stable performance

• Application Intrusion Detection - Anita Jones
  – Detect intrusion at application context via signature-behavior of functional portion of large application
John Stankovic

- Professor (joined 1997),
- Ph.D.: Brown University (1979)
- Research Interest:
  - Real-time computing, embedded computing
  - operating systems
  - wireless sensor networks
  - large scale distributed computing.
- Principal Investigator of Laboratory for Next Generation Real-Time Computing UVA
- Edited 5 books, and many book chapters
- Award
  - BP America Professor (CS) UVA, since 1997.

Publication


Jack Davidson

- Professor (joined 1982)
- Research Interest:
  - Compilers, code generation, optimization, and computer architecture
- Projects
  - National Compiler Infrastructure (NCI) project, which developed Zephyr, a tool suite for compiler and architecture research.
  - New s/w dev. environment. for high-performance embedded app.
- Books
  - C++ Program Design (best selling, 1997)
Alfred Weaver

• Professor (joined 1977)
• Ph.D.: UIUC (1976)
• Research Interest:
  – Computer networks, network protocols, telemedicine, electronic commerce
  – medical data privacy and security
• Co-authored four books, six book chapters, over 140 refereed papers,

Publication

• Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation, Bruce Childers, Jack Davidson, and Mary Lou Soffa, NSF Next Generation Software Workshop, during the International Parallel and Distributed Processing Symposium (IPDPS), France, 03.
• A Formal Specification for Procedure Calling Conventions, M. W. Bailey and J. Davidson, SIGPLAN-SIGACT Symposium on Principles of Programming Languages, 1995

Publication


Publication

• Enforcing Data Security with Web Services, Weaver, A.C., IEEE Int. Conf. on Industrial Technology (ICIT’05), Hong Kong
• A Privacy Preserving Enhanced Trust Building Mechanism for Web Services, Wu, Zhengping, and Weaver, Alfred C., Conf. on Privacy, Security, and Trust (PST’05), Canada, 05.
• A Security Architecture for Distributed Data Security, Weaver, A.C.,IEEE Int. Conf. on Emerging Technologies and Factory Automation (ETFA’05), Italy,2005.
• Dynamic Trust Establishment with Privacy Protection for Web Services, Wu, Zhengping, and Weaver, Alfred C., IEEE Int. Conf. on Web Services,2005.
• Token-Based Dynamic Trust Establishment, Wu, Zhengping, and Weaver, Alfred C., ACM Southeast Conference,2005.
• Enforcing Distributed Data Security via Web Services, Weaver, Alfred C., IEEE Workshop on Factory Communications Systems, Austria, 2004.
• Distributing Internet Services to the Network’s Edge, Alfred C. Weaver and Michael W. Condry, IEEE Transactions on Industrial Electronics, 2003
Publication

- Network Communications for Cluster Computing, Weaver, A. C., Local Computer Networks 1998.
- MESH: Distributed Error Recovery for Multimedia Streams in Wide-Area Multicast Networks, Lucas, Matthew T., Dempsey, Bert J., and Weaver, Alfred C., IEEE Inter. Conf. on Communications (ICC'97), Canada.
- The Internet and the World Wide Web, Weaver, A. C., lECON'97

Publication

- Catching and Identifying Bugs in Register Allocation, Yuqiang Huang, Bruce R. Childers, and Mary Lou Soffa, Symposium on Static Analysis, Korea, 2006.
- Dimension: An Instrumentation Tool for Virtual Execution Environments, Jing Yang, Shukang Zhou, and Mary Lou Soffa, Second Int'l. Conf. on Virtual Execution Environments (VEE '06).
- Testing in Resource Constrained Execution Environments, Gregory M. Kapfhammer, Mary Lou Soffa and Daniel Mosse, ACM/IEEE International Conference on Automated Software Engineering, 2005
- Planning for Code Buffer Management in Distributed Virtual Execution Environments, Shukang Zhou, Bruce R. Childers and Mary Lou Soffa, ACM/USENIX Virtual Execution Environments Conference (VEE'05).
- Demand-Driven Structural Testing with Dynamic Instrumentation, Jonathan Misurda, James Clause, Juliya L. Reed, Bruce Childers and Mary Lou Soffa, ACM SIGSOFT Int'l. Conference on Software Engineering (ICSE'05).

Publication

- Low Overhead Program Monitoring and Profiling, Naveen Kumar, Bruce R. Childers and Mary Lou Soffa, ACM SIGPLAN/SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE'05).
- TDB: A Source-Level Debugger for Dynamically Translated Programs, Naveen Kumar, Bruce R. Childers and Mary Lou Soffa, ACM SIGPLAN/SIGSOFT Sixth Int'l. Symposium on Automated and Analysis-Driven Debugging (ADEBUG'05).
- Jazz: A Tool for Demand-Driven Structural Testing, J Misurda, J Clause, J L Reed, P Gandra, B R Childers, M L Soffa, 14th ETAPS Int'l Conf. on Compiler Construction (CC'05).
- A Model-based Framework: An Approach for Profit-driven Optimization, Min Zhao, Bruce R. Childers, and Mary Lou Soffa, ACM SIGMICRO Int'l. Conf. on Code Generation and Optimization (CGO'05).
- Predicting the impact of optimizations for embedded systems, Min Zhao, Bruce R. Childers, and Mary Lou Soffa, ACM SIGPLAN Symposium on Languages, Compilers, and Tools for Embedded Systems, 2003

Mary Lou Soffa

- Professor and Department Chair
- Ph.D.: U. of Pittsburgh (1977)
- Research Interest:
  - Optimizing compilers
  - Compilers for embedded systems,
  - Program analysis, debugging and testing
William Wulf

- Professor (since 1990)
- President of the National Academy of Engineering
- Faculty of CMU (1968 – 1981)
- Ph.D.: UVA (1968, 1st CS Ph.D. in UVA)

Research Interest:
- National science policy
- Architecture
- Security

Contribution:
- He designed Bliss, a systems-implementation language adopted by DEC minicomputer.
- He designed and constructed the C.mmp multiprocessor and Hydra, one of the first OS to explore capability-based protection.
- He developed PQCC, a technology for the automatic construction of optimizing compilers, and
- He designed the WM pipelined processor.

Publication

- Are We Scientists or Engineers?, William A. Wulf, ACM Computing Surveys, 1995.

Sang Son

- Professor
- Ph.D.: U. of Maryland (1986)

Research Interest:
- Real-time computing, database and data services,
- QoS management, data services in embedded and mobile networks, and information security

Current Projects
- QoS management for real-time data services
- NEST: Network virtual machine for real-time coordination
- Feedback control real-time scheduling

Previous Projects
- BeeHive: distributed real-time multimedia database
- Infotech: mobile and web-based information services
- StarBase real-time database server
- Transaction scheduling
- Predictability and database modeling
- Multimedia synchronization

Publication

- Managing Deadline Miss Ratio and Sensor Data Freshness in Real-Time Databases, K. Kang, S. H. Son, and J. Stankovic, IEEE Transactions on Knowledge and Data Engineering, 2004
Publication


Andrew Grimshaw

- Professor
- Ph.D.: UIUC (1988)
- Research Interest:
  - Grid computing
  - high-performance parallel computing
  - compilers for parallel systems
  - operating systems
- Project
  - Legion: World-wide Virtual Computer

Publication

Paul Reynolds

- Professor (joined 1980)
- Ph.D.: U. of Texas, Austin (1979)
- Research Interest:
  - Modeling and simulation technology
  - Parallel and distributed systems
  - Computing for the blind

Publication

- Delta Coherence Protocols, Craig Williams, Paul Reynolds, and Bronis de Supinski, IEEE Concurrency, 2000.

Anita Jones

- Professor (joined 1988)
- Ph.D.: CMU (1973)
- Research Interest:
  - Distributed systems
  - High performance systems, computer simulation,
  - intrusion detection, survivable information systems, protection and security,
  - National science and engineering policy
- Project
  - Application Intrusion Detection

Publication

- Semantics, Scope, or Scale: Simulation Composability Versus Component-Based Software Design, Barthelet, R., Carnahan, J., Reynolds, P., Brogan, D., Fall 04 Simulation Interoperability Workshop
Publication


**Kevin Sullivan**

- Associate Professor
- Research Interest:
  - Software engineering,
  - modular architectures,
  - survivability, evolution, and integration
- Project
  - Lava: The Laboratory for Computer Architecture at Virginia

Publication

Kevin Skadron

- Associate Professor (joined 1999)
- Research Interest:
  - Computer architecture,
  - Temperature-aware and power-aware computing, thermal modeling.
  - Graphics architecture,
  - Novel processor organizations and simulation methodology

Publication


Publication


David Evans

- Associate Professor (joined 1999)
- Ph.D.: MIT (1999)
- Research Interest:
  - Inexpensive program analysis,
  - security
  - applied cryptography
- Project
  - LCLint: Annotation-Assisted Static Checking

Publication

- Static Detection of Dynamic Memory Errors. David Evans. In SIGPLAN Conference on Programming Language Design and Implementation (PLDI ’96)

Kamin Whitehouse

- Assistant Professor
- Ph.D.: UC Berkley
- Research Interest:
  - Sensor networks focuses on programming interfaces to the user.

Publication

- N-Variant Systems: A Secretless Framework for Security through Diversity, Benjamin Cox, David Evans, Adrian Filipi, Jonathan Rowanhill, Wei Hu, Jack Davidson, John Knight, Anh Nguyen-Tuong, and Jason Hiser. 15th USENIX Security Symposium, 06
- Where’s the FEEB?: The Effectiveness of Instruction Set Randomization, Ana Nora Sovarel, David Evans and Nathanael Paul, 14th USENIX Security Symposium,05
Publication

- **Macro-calibration in Sensor/Actuator Networks.** Mobile Networks and Applications Journal (MONET), 2003.
- **Semantic Streams: a Framework for Composable Inference over Sensor Data.** Kamin Whitehouse, Jie Liu, Feng Zhao. The Third European Workshop on Wireless Sensor Networks (EWSN), Switzerland. 2006

Westley Weimer

- **Assistant Professor**
- **Ph.D.: UC Berkley (2005)**
- **Research Interest:**
  - Software quality and reliability

Publication

- **Patches as Better Bug Reports.** Westley Weimer. In Proc. Inter. Conf. on Generative Programming and Component Engineering (GPCE '06).
- **Exception-Handling Bugs in Java and a Language Extension to Avoid Them.** Westley Weimer, In C. Dony et al. (Eds.): Exception Handling, 2006.
Sudhanva Gurumurthi

- Assistant Professor (joined 2005)
- Research Interest:
  - High-performance computer architectures,
  - Power management,
  - Storage systems

Kim Hazelwood

- Assistant Professor (joined 2005)
- Research Interest:
  - Optimizing compilers
  - Computer architecture

Publication

- OceanStore: An Architecture for Global-Scale Persistent Storage, John Kubiatowicz, David Bindel, Yan Chen, Steven Czerwinski, Patrick Eaton, Dennis Geels, Ramakrishna Gummadi, Sean Rhea, Hakim Weatherspoon, Westley Weimer, Chris Wells, and Ben Zhao. Inter. Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS '00), Cambridge.

Publication

**Publication**


**Marty Humphrey**

- Assistant Professor (joined 1998)
- Ph.D.: U of Massachusetts, Amherst (1996)
- Research Interest:
  - Grid computing,
  - Security, real-time computation,
  - Operating systems
- Project
  - Legion: World-wide Virtual Computer

**Publication**

- *Improving Region Selection in Dynamic Optimization Systems*, David Hiniker, Kim Hazelwood, Michael D. Smith. Int’l Symposium on Microarchitecture (MICRO-38), Spain, 2005

**Publication**

- *The University of Virginia Campus Grid: Integrating Grid Technologies with the Campus Information Infrastructure*, M. Humphrey and G. Wasson, European Grid Conference (EGC 2005), Amsterdam, 2005.