

Appendix 4
Teaching Assignments

Calendar Year 1990 Faculty and Graduate Teaching Assistant Assignments

I. Faculty Assignments and GTA Graders

A. Professor, Associate Professor, and Assistant Professor

	Teaching Assignment		Graduate Teaching Assistant
	Spring 1990	Fall 1990	
Virg Wallentine	CMPSC 690	CIS 690 CIS 990	Jim Butler
Bill Hankley	CMPSC 505	CIS 636 CMPSC 840	Jim Peters (spring)
Elizabeth Unger	Sabbatical	CIS 960	
Myron Calhoun	CMPSC 305 CMPSC 362 CMPSC 500	CIS 362	Peikun Tsai Azfar Moazzam (spring) Anindya Banerjee (spring)
David Gustafson	CMPSC 541 CMPSC 740	CIS 535 CIS 540	Richard Courtney (spring) Jim Peters (fall)
Austin Melton	CMPSC 370 CMPSC 990	CIS 606 CIS 990	Kasinath Vemulapalli (spring) Dennis Ng (fall)
Dave Schmidt	CMPSC 806 CMPSC 990	CIS 705 CIS 990	
Maarten vanSwaay	CMPSC 490 CMPSC 492 CMPSC 520	CIS 350 CIS 500	Sudhukar Ramakrishna (spring) Azfar Moazzam (fall) Anindya Banerjee (fall)
Maria Bleyberg	CMPSC 730 CMPSC 830	CIS 630 CIS 890 CMPSC 890	Muralidhar Venkatrao (fall)
Jan Chomicki		CIS 761	Dennis Ng
Olivier Danvy		CIS 570	Adrain Fiech
Rodney Howell	CMPSC 675	CIS 870 CMPSC 990	Mitch Neilsen (spring)
Masaaki Mizuno	CMPSC 620 CMPSC 720 CMPSC 798	CIS 520 CIS 720	Mitch Neilsen

K. Ravindran

CMPSC 725

CIS 825

Ka Wing Wong (spring)

B. Instructor and Instructor-Temp.

	Teaching Assignment		Graduate Teaching Assistant
	Spring 1990	Fall 1990	
Joseph Campbell	CMPSC 567 CMPSC 897	CIS 562 CIS 897	
Charles Kichler	CMPSC 110		
Clark Sexton	CMPSC 200 CMPSC 207	CIS 300	Eric Fong (spring) Mohammad Paryavi
Kole Scarbrough			Mini Supercomputer Administration

II. GTA Assigned as Classroom Teachers

Troy Anderson	CIS 204 (fall)
Ed Coburn	CIS 110 (fall)
Cindy Cook	CIS 203 (fall)
Amit Halder	CMPSC 110 (spring)
Kiang Pang	CMPSC 110 (spring)
Jim Slack	CMPSC 200
Charles Black	CMPSC 206 (spring); CIS 208 (fal)
Glen Diener	CIS 110 (fall)
Steve Hansen	CMPSC 560 (spring)
Abdul Kasim	CMPSC 206 (spring); CIS 203 (fall)
Sheela Ramanna	CMPSC 207 (spring)
Kevin Lynn	CMPSC 211 (spring)
Mohammad Paryavi	CMPSC 300 (spring)
Tom Talkington	CIS 110 (fall)

III. Miscellaneous GTA Assignments

Thenmozhi Arunan (fall,grd 110)	David Balda (spring, coordinate 200)
Vivek Bansal (fall,grd 203)	Baba Prasad (fall,grd 110)
Jeff Brogden (systems)	Kyung Doh (spring,grd 20X)
Adrian Fiech (spring,grd 300)	Eric Fong (fall,grd 200)
Puneet Gupta (fall,grd 110)	JR Hockersmith (systems)
Janaki Krishnaswamy (grd 110)	David Liu (fall,grd 20X)
Dennis Ng (spring,grd 560)	Peter Prakash (spring,systems;fall grd 203)
Sudhukar Ramakrishna (fall,grd 203)	Sheela Ramanna (fall,grd 208)
Raghavendra Rao (spring,grd 110)	S. Samdarshi (spring,grd 110;fall,grd 204)
Manhohan Sankhla (grd 110)	M. Nelakonda (grd 110)
Kasinath Vemulapalli (fall,grd 203)	M. Venkatrao (spring,grd 110)
Ka Wing Wong (spring, grd 110)	

Appendix 5a
Departmental Committees
Department of Computing and Information Sciences 1989-90

1. **Faculty Recruiting**

This committee will have a tremendous impact on the future of the department because the competition for faculty is very high. This committee will develop strategies for recruiting faculty. All faculty will participate in trying to recruit specific candidates.

Melton, Mizuno, Wallentine (Chair), and Zamfir

2. **Undergraduate Studies Committees - Hankley (Chair)**

The responsibilities of this committee are to develop curricula for undergraduate majors, coordinate with the college curriculum committee, coordinate with the graduate studies committee, and make recommendations on entrance and continuation requirements. This committee is also charged with developing service courses for majors in other departments. Thus it must coordinate with other departments on campus to provide up-to-date courses which prepare all college students to work in an information-intensive workplace.

a. *Computer Science and Information Systems Majors Subcommittee*

Gustafson (Assoc. Chair), Howell, Sexton, and Van Swaay.

b. *Service Courses Subcommittee*

Calhoun, Campbell (Asoc. Chair), Kichler, and Slack

3. **Graduate Studies**

This committee must monitor the graduate curriculum, screen applicants for grad. school, coordinate with the University of Kansas on the PhD program, recruit graduate students, and coordinate with the UG studies committee.

Hankley (Chair), Schmidt, and Wallentine

4. **Seminar Series**

This committee is responsible for coordinating speakers for a seminar series within the department. This includes recruiting local faculty and graduate students (including KU), regional faculty, ACM lecturers, faculty candidates, and 2 national speakers each year.

Gustafson (Chair), Howell, and Melton

5. **Computing Facilities**

This committee must make recommendations on the acquisition and modification of computer hardware and software tools. This includes tools for the mainframe, minis, and micros. This committee will also formulate policy on the use of the departmental computing facilities. It must also coordinate with all faculty and staff to acquire teaching and research tools.

Harris, Mizuno, Townsend, and Wallentine (Chair)

6. **Faculty Evaluation Review Committee**

The task for this committee is to review procedures for reappointment, tenure, and merit salary increase, and make recommendations to the faculty and department head. The resulting procedures, upon ratification by the faculty, will be applied by the department head.

Schmidt (Chair), Gustafson, and Wallentine

**Appendix 5b
Committee Service**

Maria Zamfir-Bleyberg

Faculty Recruiting
Faculty Evaluation Review Committees.

Myron Calhoun

Undergraduate Studies Committee

Jan Chomicki

Graduate Studies Committee

David Gustafson

Faculty Recruiting Committee
Scholarship Review Committee
Undergraduate Studies
Departmental Seminar Committee
Faculty advisor to ACM Student Chapter

William Hankley

Graduate Studies Committee
Undergraduate Studies Committee

Rod Howell Undergraduate Studies Committee
Seminar Series Committee

Austin Melton

Faculty Search Committee
Graduate Advisory Committee
Faculty Evaluation Committee
CCOP

Masaaki Mizuno

Faculty Recruiting Committee
Faculty Evaluation Committee

K. Ravindran

Computing Facilities Committee

David Schmidt

Faculty Evaluation Committee
Graduate Studies Committee

Elizabeth Unger

Undergraduate Studies

Physical Sciences subcommittee of the Graduate Council until Aug 15

Chair: Dean's Advisory Committee in Arts and Sciences until Aug 15

Strategic Planning subcommittee on Graduate Education

Maarten van Swaay

Undergraduate Studies Committee

Virgil Wallentine

Faculty Recruiting Committee

Computing Facilities Committee

Faculty Evaluation Committee

Appendix 6 Faculty Publications

Published or Accepted

- Baker, A., Bieman, J., Fenton, N., Gustafson, D., Melton, A., and R. Whittey. (1990). "A Philosophy for Software Measurement", *J. Systems Software* 12:3, pp277-281.
- Balda, D., and D. Gustafson. (1990). "Cost Estimation Models for the Reuse and Prototype Software Development Life-Cycles", *SEN* 15:(3), pp 42-50.
- Baruah, S., Howell, R., and Rosier, L. "Algorithms and Complexity Concerning the Preemptive Scheduling of Periodic, Real-Time Tasks on One Processor." To appear in *Real-Time Systems*.
- Baruah, S., Howell, R., and Rosier, L. (1990). "On Preemptive Scheduling of Periodic, Real-Time Tasks on One Processor." 15th International Symposium on Mathematical Foundations of Computer Science, LNCS 452, pp. 173-179, Banska Bystrica, Czechoslovakia.
- Bleyberg, M., Isenhour, T., Marshal, J., and T. Zhou. "The Design and Implementation of an Analytical Chemistry Expert System" presented at IEA/AIE-90 (the 3rd International Conference on Industrial and Engineering Applications of AI and Expert Systems), Charleston, SC, July 1990.
- Butler, J., and V. Wallentine. (1990). Vignettes: A Distributed Discrete Event Simulation System. International Phoenix Conference on Computers and Communications, Phoenix, AZ.
- Butler, J., and V. Wallentine. (1990). Message Bundling in Time Warp. SCS Multiconference on Advances in Parallel and Distributed Simulation, Anaheim, CA.
- Cabrera, M. and E. Unger. (1990). "Dynamic Data as Deterrent to the Tracker," Proceedings of the 1990 Sigsmall/PC Symposium on Small Systems.
- Chomicki, J., and V.S. Subrahmanian. (1990). "Generalized Closed World Assumption is Pi-0-2 complete" *Information Processing Letters* 34, 289-291.
- Chomicki, J. (1990). "Polynomial-Time Query Processing in Temporal Deductive Databases" Proc. Ninth ACM SIGACT-SIGMOD-SIGART Symposium on Principles of Database Systems, Nashville, Tennessee.
- Courtney, R., and D. Gustafson. (1990). "Evolution of Architectural Design Representations", Proceedings of the 1990 Symposium on Applied Computing.
- Danvy, O., and A. Bondorf. (1991). "Automatic Autoprojection of Recursive Equations with Global Variables and Abstract Data Types", to appear in *Science of Computer Programming*.
- Danvy, O., Jones, N., Gomard, C., Bondorf, A., and T. Mogensen. (1990). "A Partial Evaluator for the Lambda-Calculus", Proceedings of the IEEE Computer Society 1990 International Conference on Computer Languages, pp. 49-58.
- Danvy, O., and C. Consel. (1990). "From Interpreting to Compiling Binding Times", Proceedings of the European Symposium on Programming ESOP 90, pp. 88-105.

- Danvy, O., and A. Filinski. (1990). "Abstracting Control", Proceedings of the 1990 ACM Conference on Lisp and Functional Programming, pp. 151-160.
- Danvy, O., and C. Consel. (1991). "Static and Dynamic Semantics Processing", Proceedings of the 1991 ACM Conference on Principles of Programming Languages.
- Danvy, O., Friedman, J., and J. Franco. (1991). "The Scheme Programming Language", in "A comparative study of parallel programming languages: the Salishan problems" (John Feo, Ed.), Elsevier Science Publishers, The Netherlands.
- Even, S., and D. Schmidt. (1990). Type inference for action semantics. In Proc. 1990 European Symp. on Programming, Lecture Notes in Computer Science 432, Springer-Verlag, Berlin, pp. 118-133.
- Fenton, N., and A. Melton. (1990). Deriving structurally based software measures, The Journal of Systems and Software, Vol. 12, pp. 177-187.
- Gouda, M., Howell, R. and Rosier, L. "The Instability of Self-Stabilization." Acta Informatica 27 (1990), pp. 697-724.
- Gustafson D., Melton, A., An, K., and I. Lin. (1990). "Software Maintenance Models" in IEEE Tutorial on Software Maintenance and Computers, (D. Longstreet, ed.), pp 23-35, IEEE Computer Society Press.
- Hagemann, C. and E. Unger. Fuzzy Sets in Multi-level Decision making (A LAN Small Group DSS), Cybernetics and Systems: An International Journal.
- Hankley, W., and J. Peters, "Temporal Specification of Ada Tasks", Jan 90 Hawaii Conf on System Sciences.
- Hankley, W., and J. Peters. (1990). "Proving Specifications of Tasking Systems Using Ada/TL", Tri-Ada 90 Conference, Baltimore, MD.
- Hankley, W., and J. Peters. (1991). "A Proof Method for Ada/TL Specifications", 8th Conf on Ada Technology, Atlanta, GA.
- Hankley, W. (1991). Tutorial on "Formal Specification of Programs" accepted for SIGCSE Conference, San Antonio, TX.
- Howell, R., Rosier, L., and Yen, H. "A Taxonomy of Fairness and Temporal Logic Problems for Petri Nets." To appear in Theoretical Computer Science, special issue for MFCS '88.
- Howell, R., Rosier, L., and Yen, H. "Global and Local Views of State Fairness." To appear in Theoretical Computer Science.
- Keller-McNulty, S., McNulty, M., and D. Gustafson. (1990). "Stochastic Models for Software Science". Accepted for publication in Journal of Systems and Software.
- Liu, Y.D., Wong, K.W. and E.A. Unger. (1990). "Using Active Messages to Implement Office Procedures," ACM 1990 Symposium on Applied Computing.
- Main, M., Melton, A., Mislove, M., and D. Schmidt, editors. Proc. 5th Conf. on Math. Foundations of Programming Language Semantics, Lecture Notes in Computer Science 442, Springer, Berlin, 1990.

- McNulty, S. and E. A. Unger, "Database System Security: Inferential Attack" National Academy of Science, Invited Paper 1991.
- Melton, A., Gustafson, D., Bieman, J., and A. Baker. (1990). "A Mathematical Perspective for Software Measures Research", Software Engineering Journal 5:5, pp 246-254.
- Mizuno, M., and M. Neilsen. (1991). Decentralized Consensus Protocols. 1991 Phoenix International Conference on Computers and Communications.
- Ng, Y., Melton, A., and E. A. Unger. (1990). "A Method for Constructing Generalized Non-Normal Form Models" Proceedings of the 19th Annual Computer Science Conference, ACM.
- Perng, J. and E. Unger. (1990). "A User Friendly Front-End for MPS," ACM 1990 Symposium on Applied Computing.
- Peters, J. F., Ramanna, S., and E.A. Unger. (1990). "Logic of Knowledge and Belief in the Design of an Integrity Kernel for an Office Information System," ACM Annual Computer Science Conference (poster session).
- Peters, J. F., Ramanna, S., and E. A. Unger. (1990). Design of Knowledge-based Integrity Systems with ISL++". International Conference on Software Engineering and Knowledge Engineering.
- Ramanna, S., Peters, J.F., and E. A. Unger. (1990). "Temporal Specification of an Integrity Kernel for Multimedia Office Systems," ACM 1990 Symposium on Applied Computing.
- Ramanna, S., Peters, J.F., and E.A. Unger. (1990). "Nonmonotonic Logic in the Specification of an Integrity System". Proceedings of 13th National Computer Science Conference.
- Ramanna, S., Peters, J.F., and E.A. Unger. (1990). "Logic of Knowledge and Belief in the Design of Distributed Integrity Kernels," PARBASE-90: International Conference on Database, Parallel Architectures, and their Applications.
- Ramanna, S. Peters, J.F., and E.A. Unger. (1990). "Design of Knowledge-Based Integrity Systems with ISL++," International Conference on Software Engineering and Knowledge Engineering.
- Ranft, I., and D. Gustafson. (1990). "Using the Software Process Model to Analyze a Software Project", Proceedings of CompSac90.
- Ravindran, K. (1990). Application-specific Group Communications in Distributed Servers. 10th International Conference on Computer Communications, IEEE INFOCOM 91, Miami, FL.
- Ravindran, K. (1990). A Flexible Broadcast Communication Interface for Distributed Applications. Submitted to 11th International Conference on Distributed Computing Systems, IEEE ICDCS.
- Ravindran, K. (1990). Protocol Bypass Concept for High Speed OSI Data Transfer. 2nd International Workshop on Protocols for High Speed Networks, IFIP WG6.1/WG6.4, Palo Alto (CA).
- Saiedian, H. and E. A. Unger. (1990). "ABSL: An Actor Based Specification Language for Office Automation," ACM Computer Science Conference.

- Saiedian, H., and E. Unger. (1990). "A Formal Specification Tool for Distributed Office Systems". Proceedings of the 1990 Sigsmall/PC Symposium on Small Systems.
- Schmidt, D. (1990). Action semantics-based language design. Invited paper, Proc. SOFSEM90 winter school, Janske Lazne, Czechoslovakia, 30 pp.
- Shenoi, S., and A. Melton. (1990). An extended version of the fuzzy relational database model, Information Sciences, Vol. 52, pp. 35 - 52.
- Shenoi, S., Melton, A., and L.T. Fan. (1990). An equivalence classes model of fuzzy relational databases, Fuzzy Sets and Systems, Vol. 32, pp. 153 - 170.
- Shenoi, S. and A. Melton. (1990). A set-relational interpretation of similarity and proximity relations. 4th International Workshop of the Bellman Continuum, KSU.
- Unger, E. A. and S. Keller-McNulty. (1990). "The Deterrent Value of Natural Change in a Statistical Database," Proceedings of 13th National Computer Security Conference, Washington D.C.
- Unger, E., Harn, L., and V. Kumar. (1990). "Measures of Database Information based upon Information Entropy". Proceedings of 6th Computer Security Applications Conference.
- Unger, E., S. McNulty, and P. Connelly. (1990). "Natural Change in Dynamic Databases as a Deterrent to Compromise by Trackers". Proceedings of the 6th Computer Security Applications Conference.
- Wong, K. W., and E. A. Unger. (1990). "Specification and Verification of Active Message Systems,". Proceedings of the 1990 Sigsmall/PC Symposium on Small Systems.

Submissions

- Bleyberg, M., Isenhour, T., Marshal, J., and T. Zhou. "On Concurrency Control in an Analytical Chemistry Expert System" submitted to the International Journal of Applied Intelligence.
- Bleyberg, M. "An Entity-Relationship Algebra" submitted to the International Journal of Foundations of Computer Science.
- Bleyberg, M. "Modeling Concurrency with AND/OR Algebraic Theories" submitted to 2nd International Conference on Algebraic Methodology and Software Technology, Iowa City, Iowa, May 1991.
- Chomicki, J., and T. Imielinski. "Finite Representation of Infinite Query Answers" 45 pages. Submitted to ACM Transactions on Database Systems.
- Chomicki, J. "Depth-Bounded Bottom-Up Evaluation of Logic Programs" 30 pages. Submission in Journal of Logic Programming.
- Chomicki, J. "Efficient Maintenance of Dynamic Integrity Constraints Using Materialized Temporal Views" 17 pages. Submitted to 1991 ACM SIGMOD Conference.
- Dybkjaer, H., and A. Melton. (1990). Data types and dialgebras. Submitted to the Proceedings of Workshop on Category Theory Applied: Paradigmatic Topics, Bremen, Germany.

- Dybkjaer, H., and A. Melton. Comparing Hagino's categorical Melton, A., and S. Sheno. Fuzzy relations and fuzzy relational databases. Submitted to International Journal of Computers and Mathematics with Applications.
- Dybkjaer, H., and A. Melton. Comparing Hagino's categorical programming language and typed lambda-calculi. Submitted to Theoretical Computer Science.
- Even, S., and D. Schmidt. Category-sorted algebra-based action semantics, Journal of Theoretical Computer Science, accepted for publication and in press.
- Even, S., and D. Schmidt. Type inference for action semantics. In Proc. 1990 European Symp. on Programming, Lecture Notes in Computer Science 432, Springer-Verlag, Berlin, 1990, pp. 118-133.
- Hagemann, C. and E. A. Unger. (1990). Theoretical Foundations for a Multilevel SGDSS. Submitted to MIS Quarterly.
- Hansen, S., and E. A. Unger. (1990). "An Extended Memoryless Inference Control Model". Submitted to Sigmod 1991.
- Hansen, S., and E. Unger. (1990). "Horizontal Partitioning a tool for inference control". Submitted to Applied Computing Conference.
- Hsieh, S., Unger, E., and R. Mata. (1990). Static Analysis of Programs for Observable Information Flow. Submitted to Journal of Systems and Software.
- Hsieh S., Unger, E., and R. McBride. (1990). Dynamic Slicing Algorithms. Submitted to IEEE TOSE.
- Hsieh, S., and E. Unger. (1990). Observable Data Flow for Security Analysis. Submitted to Journal of Systems and Software.
- Howell, R., Rosier, L., and Yen, H. "Normal and Sinkless Petri Nets." Submitted to Journal of Computer and System Sciences.
- Liu, D., and E. A. Unger. (1990). "An Integrity Model based on Knowledge." Submitted to Applied Computing Conference.
- Main, M., Melton, A., Mislove, M., and D. Schmidt, editors. Proc. 5th Conf. on Math. Foundations of Programming Language Semantics, Lecture Notes in Computer Science 442, Springer, Berlin, 1990.
- Melton, A., Ng, Y., and E. Unger. (1990). "Minimality fo Normalized Complex Objects on Plotkin Powerdomian Ordering". Submitted to PODS 1991.
- Melton, A., Schroeder, B., and G. Strecker. Lagois connections. Submitted to SIAM Journal of Computing.
- Melton, A., Ng, Y., and E. Unger. (1991). Transforming normalized relations into complex object views. Submitted to International Conference on Mathematical Foundations of Database and Knowledge Base Systems, Rostock, Germany.
- Melton, A., Ng, Y., and E. Unger. (1991). Syntactically and semantically correct normalized complex objects. Submitted to ICALP'91, Madrid, Spain.

- Melton, A., Schroeder, B., (1991). Connections. Submitted to the 7th International Conference on the Mathematical Foundations of Programming Semantics, Pittsburgh, Penn.
- Melton, A., and S. Sheno. (1991). Partition relational database model: an extended abstract. Submitted to International Conference on Mathematical Foundations of Database and Knowledge Base Systems, Rostock, Germany.
- Sheno, S., and A. Melton. Restricted Domain Partitioning: A mechanism for establishing contexts. Submitted to IEEE Transactions on Knowledge and Data Engineering.
- Mizuno, M., Neilsen, M., and K. Pang. (1990). A Generalized Token Based Distributed Algorithm for AND-Synchronization. Submitted to IEEE Transaction on Parallel and Distributed Computing.
- Mizuno, M., and M. Neilsen. (1990). Generalized Assertion Based Distributed Algorithms for AND-Synchronization. Submitted to Distributed Computing.
- Mizuno, M., and M. Neilsen. (1990). Read and Write Coterie. Submitted to Information Processing Letters.
- Mizuno, M., and M. Neilsen. (1990). Coterie Join Algorithm. Submitted to IEEE Transaction on Parallel and Distributed Computing.
- Mizuno, M., and M. Neilsen. (1990). A Dag-Based Algorithm for Distributed Mutual Exclusion. Submitted to the 11th International Conference on Distributed Computing Systems.
- Mizuno, M., Halder, A., and M. Neilsen. (1990). A Node Recovery Algorithm for Assertion-based Distributed Mutual Exclusion Algorithms. Submitted to the 11th International Conference on Distributed Systems.
- Mizuno, M., Neilsen, M., and R. Rao. (1990). A Token Based Distributed Mutual Exclusion Algorithm based on Bicoterie. Submitted to the 11th International Conference on Distributed Systems.
- Mizuno, M., and D. Schmidt. A denotational semantics-based correctness proof of a security flow control algorithm. Journal of Formal Aspects of Computing, submitted Dec. 1990.
- Ramanna, S, Peters, J.F. and E. Unger. (1990). Nonmonotonic Logic in the Specification of an Integrity System. Submitted to ACM TOIS.
- Ravindran, K. (1990). Tradeoffs Between Complexity and Efficiency of Distributed Application Protocols. Submitted to IEEE Transactions on Computers.
- Ravindran, K. (1990). Correcting Remote References to a Server in Distributed Operating Systems. Submitted to Computer Networks and ISDN Systems (North-Holland Publ. Co.).
- Ravindran, K. (1990). A Flexible Broadcast Communication Interface for Distributed Applications. Submitted to 11th International Conference on Distributed Computing Systems, IEEE ICDCS, Oct. 1990.
- Ravindran, K. (1990). A Model of Naming for Fine-grained Service Specification in Distributed Systems. Submitted to ACM Symposium on Small and Personal Computers, ACM SIGSMALL/PC, Nov. 1990.
- Schmidt, D. Action semantics-based language design. Invited paper, Proc. SOFSEM90 winter school, Janske Lazne, Czechoslovakia, Nov. 1990, 30pp.

Unger, E. A., and S. McNulty. (1990). Data Compromise in a Dynamic Database. Submitted to IEEE Data and Knowledge Engineering.

Appendix 7 Grantsmanship

Funded

Maria Zamfir-Bleyberg

Second year of National Science funding for "ANALYTICAL DIRECTOR - An Artificial Intelligence/Robotic Expert System for the Analytical Laboratory", Professor T. Isenhour (principal investigator) and I (co-investigator).

Travel Faculty Development Award for \$1500.

David Gustafson

NATO, "Formal Foundations of Software Measurement", #0343/88.

"A Proposal for Cooperative Research in Software Measurement", NSF International Programs Sep 1, 1990.

"Developing a Formal Process Model for Software Re-engineering Environments" AFOSR proposal (with Eric Byrne), November 1, 1990.

Austin Melton

ONR Grant N00014-88-K-0455, through Sept. 1991.

NATO Collaborative Research Grant 034/88, through Summer 1991.

K. Ravindran

"Architectures and Protocols for High Speed Packet Switching in High Speed Multi-service networks", research initiation grant (\$11,000) from Kansas Technology Corporation to support two graduate research assistants for the period Nov. 1989 to July 1990.

"Software Systems for Fault-tolerant Industrial Applications", research initiation grant (\$13,764) from Kansas Technology Corporation to support two graduate research assistants for the period Aug. 1990 to May 1991.

David Schmidt

NSF Grant CCR-8822378, Semantics-directed compiler synthesis, June 89-May 91, \$157,000.

NSF Grant INT-9014042, Semantics-directed compiler synthesis: travel, Jan 91-Dec 94, \$12,000.

Elizabeth Unger

CRCCA Grant 91E014, Data Integrity in Data Systems, August 90 - May 91, \$9,800.

CRCCA Grant 91E015, Inferential Data Security in Data Systems, August 90 - May 91, \$9,800.

Virgil Wallentine

CRCCA Grant 91E012, Temporal Locality in parallel and Distributed Discrete Event Simulation, August 90 - May 91, \$18,234.

Pending:

Jan Chomicki

NSF, Dynamic Integrity Constraints in Databases, \$70,000.

David Gustafson "A Proposal for Cooperative Research in Software Measurement", NSF International Programs Sep 1, 1990.

"Laboratory for Office Automation and Direct Manipulation" NSF equipment proposal (Bill Hankley), November 16, 1990.

William Hankley

NSF, Laboratory for Office Automation and Direct Manipulation, \$17,197.

Austin Melton

NSF Research Travel Grant with Dave Gustafson

Sun Microsystems Grant for equipment.

K. Ravindran

"Design and Implementation of a Flexible Broadcast Communication Interface for Distributed Applications", grant proposal submitted to National Science Foundation for funding (\$174,087) for the period from June 1991 to May 1993 to cover purchase of SUN-SPARC workstations and software, summer support for self and support of two graduate research assistants

Elizabeth Unger

NCSC, \$61,326, Inferential Theoretical Approaches to Modelling.

David Schmidt

British Science and Engg. Research Council proposal, Research in semantics and concurrency at Univ. of Edinburgh, July-Aug. 1991, approx. \$2000.

NSF proposal, Action semantics and partial evaluation (with Olivier Danvy), June 1991-May 93, \$190,000.

Rejected:

Jan Chomicki

Faculty Development Award, 1991 SIGMOD International Conference, \$900.

BGR Award, Research in Deductive Databases, \$450.

Rod Howell

NSF, (with Mizuno, M., Ravindran, K., and D. Schmidt). Programming Languages & Distributed Computing Laboratory, \$1,365,691.

Austin Melton

NASA, Development of a Lattice-Theoretic Relational Database Model for Data Abstraction, \$??.

K. Ravindran

Faculty Development Award, Data Driven Communication in Distributed Operating Systems, \$3,000.

BGR, Architecture and Protocols for High Speed Packet Switching in Multi-Service Networks, \$1,750.

NSF, A Data Driven Communications Architecture for Distributed Operating System, \$70,000.

Virgil Wallentine

Hewlett Packard, Proposal for an Electronic Studio, \$1,471,172.

AT&T, Proposal for Multiprocessor for Graduate Education and Research, \$800,000.

Appendix 8

Current Research Programs of the CIS Faculty

Research in this department can be categorized in five basic areas - programming languages, software engineering, knowledge engineering, data base systems, and parallel and distributed systems. In this section we list the current specific research projects of the CIS faculty.

Maria Zamfir, Ph.D., UCLA. Her research interests include different but interacting areas: the initial algebra semantics of parallel distributed computing, neural networks, and formal semantic models for the design of databases and knowledge-based systems.

In the area of parallel computing, her goal is to develop a language for writing and testing formal specifications of parallel distributed systems based on the AND/OR net model. The AND/OR net model is an initial algebra semantics model for concurrent computing systems, which I have been working at for the past few years. I have also been examining Petri nets as object-oriented systems in which abstract data types provide values for attributes. I have been using this view of Petri nets to define an abstract operational semantics for them based on "reflection". Finally, I hope that the study of neural networks will open new directions in my research in the area of parallel computing.

Regarding databases and knowledge-based systems, she is interested in building practical systems with appropriate logical foundations. At present, she is involved in the design and implementation of an expert system that can design and simulate an analytical chemistry procedure and controls the robot during the procedure execution. Regarding databases, she has been working at the implementation of an object-oriented database. This implementation is based on a formal categorical model of databases, which I have developed.

Myron A. Calhoun, Ph.D., Arizona State. Trying to delve deeply into the uses of Finite Inductive Sequences (FIS) as described by Fisher & Case. FIS appears to be directly applicable to the compression of textual data as well as compressing, processing, and recognizing visual images; this latter may also include applications in mobile free-ranging robotics. His ongoing (but now mostly background) research emphasizes the application of computers to real-world problems such as the development of computer interfaces for the handicapped and low-cost packet-radio networks."

David A. Gustafson, Ph.D., Wisconsin-Madison. His research interests are in the area of software engineering. He is formalizing the theory of software measures so that it becomes obvious what is being measured and what properties the measure has. He is also doing research into the problems of validating software measures. Another area of research is software reliability. He is currently investigating models of the software structure that can be used to develop a software reliability model. Related to the area of reliability is the area of software testing methods. He is developing more thorough test methods that have formal bases. Another area in which he is involved is the area of formal notations for diagrams, both data flow diagrams and hierarchy diagrams. The creation of better notations will allow more formal work on transformations of the diagrams. Finally, he is working on developing notations for describing the software development process in terms of the documents that are produced.

Rodney Howell, PhD, University of Texas at Austin. His research interests lie mainly in three areas: real-time scheduling, self-stabilization, and Petri nets. In the area of real-time scheduling, he has been looking at the complexity of finding valid schedules for various types of recurring real-time task systems. In many cases, the problems turn out to be NP-hard. His goal is to identify as many situations as possible in which schedules can be constructed efficiently. Regarding self-stabilization, he is interested in examining various theoretical limitations for self-stabilizing systems. For example, he

has recently explored situations in which certain types of models cannot simulate other types of models while preserving self-stabilization. Finally, in the area of Petri nets, he has been examining the computational complexity of various problems, such as reachability, boundedness, equivalence, liveness, and fair nontermination, for different classes of Petri nets. His main goal in this area of research is to tighten the known bounds on the complexity of the reachability problem for Petri nets.

William J. Hankley, Ph.D., Ohio State University. His research centers on formal specification of programs. Writing formal specifications is a kind of programming; it is the use of very high level non-procedural languages. The research focus is on object-oriented and modular structure (using ADA concepts), high level data types (sets, maps, sequences as in VDM), logic specifications (predicate calculus and Prolog notations), and temporal description of task behaviors (temporal logic). Related work includes formal verification of specified system properties, development of executable specifications as program prototypes, and use of direct manipulation interfaces for rapid development of prototypes.

Austin Melton, Ph.D., Kansas State University. His research interests include programming semantics, software engineering, complex objects, and category theory. In programming semantics he is interested in using category theory to understand and explain programming semantics, and further he is interested in seeing how category theory itself can be used as a programming language. In software engineering he works with software measures or metrics. His work involves trying to develop a foundation upon which one can with confidence design and define useful software measures. In databases he is working to define a general method for defining and studying non-normal forms structures.

Masaaki Mizuno, Ph.D., Iowa State University. Research interests are in various aspects of distributed systems. He has worked on an information flow control mechanism for modular programming systems. He also works with Dr. David A. Schmidt on theoretical aspects of information flow by applying methodology in programming semantics. In his research in distributed systems, he and his students have developed efficient distributed mutual exclusion algorithms and distributed AND-synchronization. Currently, his group is studying concurrency control and recovery issues of transaction based distributed database systems.

K. Ravindran, Ph.D., British Columbia. Currently pursuing research on distributed systems architectures and high speed packet networks. Specific areas being investigated are: (i) Data-driven communication in distributed operating systems to allow fine-grained reconfigurability of services and fine-grained parallelism among functions that compose a server; (ii) Design of a flexible communication kernel for distributed applications whereby different applications may choose different forms of communication mechanisms to suit their requirements; (iii) Network architectures and protocols to handle congestion control, bandwidth management and packet multicasting in high speed packet switching.

David Schmidt, Ph.D., Kansas State University. Pursuing research on the theory of programming languages as it is expressed within denotational semantics. He uses denotational semantics to analyze the structure of programming languages and to implement them. In past research, he has shown how to synthesize efficient implementation data structures for languages defined by denotational semantics. He and a research student are building a "rapid prototyping," compiler synthesis system based on these ideas.

Recently, he has studied the category-theoretic foundations of a denotational semantics variant called "action semantics." He and a student have developed a sound and complete type inference algorithm for action semantics; the algorithm is being implemented as part of a programming language analysis "workbench."

Elizabeth Unger, Ph.D., University of Kansas. The entire thrust of her research program is in the development of security and integrity systems based upon the object oriented programming paradigm. The work proceeds with two foci: description of the general inference problem and characterization of the database administrator and user level integrity constraints. The first thrust includes the completion and documentation of the value of natural change for deterrent value on the tracker attacks; the mathematical and statistical characterization of the security value of such change; the security value of change in conjunction with other deterrent methods; the characterization of information increment given a user data increment. This latter characterization is just beginning with Shannon's concept of entropy as the basis for measurement. Such a measure will allow the use of a semantic model to characterize statistically the security risk of releasing data in certain risk environments. The second thrust is concerned with the formal description of one aspect of user level integrity, the temporality. In this thrust, a next step is the clear definition of user level integrity, the specification of a language in which to specify constraints (to be used in the security project also) and the definition of the architecture of such a system within contemporary operating systems.

Maarten van Swaay, Ph.D., Leiden (Netherlands). Interests in laboratory instrumentation and in neural network systems. He has written a chapter on laboratory computing for a handbook on chemical instrumentation; the book is scheduled for publication in March 1990. In addition to technical areas Dr. van Swaay has a strong interest in social and ethical issues of computing, and has developed a course in that area in our department.

Virgil Wallentine, Ph.D., Iowa State University. Research includes parallel and distributed systems and their applications. More specifically, his work centers on what can be distributed, how it can be distributed across multiple processing units, and what properties of the system make it amenable to distribution. Presently, he is working in the area of Parallel Discrete Event Simulation (PDES) and in methods for debugging distributed programs. Specific emphasis are on study of a formal language semantics for the time-space model of synchronization and a study of temporal behavior of PDES. Several specific projects are on-going which include the construction of a system which supports a visual programming facility for queueing networks, a performance prediction environment for PDES, and a knowledge-based debugging system for distributed programs.