

# Curriculum Vitae of Spiros Mancoridis, Ph.D.

## Personal Information:

- **Address:** Department of Computing, College of Computing and Informatics, Drexel University, 3141 Chestnut Street, Philadelphia, PA, 19104, USA.
- **Phone/FAX:** (215) 895-6824 / FAX: (215) 895-0545
- **E-mail:** [Spiros.Mancoridis@drexel.edu](mailto:Spiros.Mancoridis@drexel.edu)
- **WWW:** <http://www.cs.drexel.edu/~spiros>
- **Society Memberships:** Senior Member of the IEEE, Senior Member of the ACM.
- **Birth:** 1968, Montreal, Canada
- **Citizenships:** USA (naturalized) and Canada

## Education:

- **1996: Ph.D.** (Doctor of Philosophy in Computer Science) University of Toronto, Department of Computer Science. **Thesis:** *Controlling the Interactions of Architectural Design Components Using Scoping Rules*. **Supervisor:** Prof. Richard C. Holt
- **1992: M.Sc.** (Master of Science in Computer Science) University of Toronto, Department of Computer Science. **Thesis:** *A Visual Programming Environment for Object-Oriented Turing* **Supervisor:** Prof. Richard C. Holt
- **1990: B.C.S.H.** (Bachelor of Pure and Applied Science with in Computer Science with Honors) Acadia University, Department of Computer Science.

## Academic Experience:

- **2019-present: The Auerbach Berger Chair in Cybersecurity**, College of Computing and Informatics, Drexel University.
- **2016-present: Tenured Distinguished Professor of Computer Science**, College of Computing and Informatics, Drexel University.
- **2016-2019: Technical Fellow of the Cybersecurity Institute**, Drexel University.
- **2015-2016: Interim Dean**, College of Computing and Informatics, Drexel University.
- **2013-2015: Department Head of Computer Science & Senior Associate Dean of Computing**, College of Computing and Informatics, Drexel University.
- **2013-2016: Tenured Full Professor of Computer Science**, College of Computing and Informatics Drexel University.
- **2012-2013: Interim Department Head of Computer Science**, College of Engineering, Drexel University.
- **2007-2013: Tenured Full Professor of Computer Science**, College of Engineering, Drexel University.
- **2002-2007: Tenured Associate Professor of Computer Science**, College of Engineering, Drexel University.
- **2001-present: Affiliated Professor of Electrical & Computer Engineering**, College of Engineering Drexel University.

- **2001-2002: Tenured Associate Professor of Mathematics and Computer Science,** College of Arts and Sciences, Drexel University.
- **1996-2001: Assistant Professor of Mathematics and Computer Science,** College of Arts and Sciences, Drexel University.

### **Professional Experience:**

- **1997 –2001: Visiting Professor at the AT&T Labs – Research.** Duties: Conducting research in reverse engineering, software maintenance, and tool integration.
- **1992: Visiting Researcher at the IBM Canada Ltd. Center for Advanced Studies (CAS).** Duties: Technology transfer of academic research to industry; developing tool integration techniques for object-oriented programming and architectural design environments.
- **1988-1989: Co-op student at the IBM Canada Ltd. Laboratory.** Duties: Ada compiler performance evaluation; VM systems administration.

### **Legal Consulting:**

- **2014:** Expert witness consulting for O’Kelly, Ernst & Bielli, LLC
- **2014:** Expert witness consulting for US Department of Justice
- **2008:** Expert consulting for software copyright infringement litigation for lawyer Mr. Ely Goldin, Fox Rothschild LLP, 1250 S Broad Street, P.O. Box 431, Lansdale, PA 19446.
- **2007:** Expert consulting for software patent infringement litigation for lawyer Mr. Daniel L. Calder, Ratner-Presita, One Westlakes, Berwyn P.O. Box 980 Valley Forge, PA 19482.
- **2006:** Expert consulting for software copyright infringement litigation for lawyer Mr. William J. Brennan, IV, Pepper Hamilton, 3000 Two Logan Square, 18<sup>th</sup> and Arch Streets, Philadelphia, PA 19103-2799.
- **2003:** Expert testimony and software analysis on software copyright infringement litigation for lawyer Mr. George Berkelbach, Suite 300, 1401 Walnut Street, Philadelphia, PA, 19102.
- **2002:** Expert opinion of education-related litigation for lawyer Mr. Bruce McCullogh, PO Box 397, Wilmington, DE 19899-0397.

### **Defense Contracting Consulting:**

- **2005-2008:** Advisor for Lockheed Martin’s Advanced Technology Laboratory in Cherry Hill NJ.
- **2004-2008:** Technical software consulting for Lockheed Martin’s ELDP program in Moorestown NJ.

### **Other Consulting:**

- **2012-13:** Software Development Tools for Nutrition for Robert J. Karp, MD, Professor of Pediatrics, SUNY-Downstate Medical Center

## Software Licenses:

- **2000:** (Mancoridis and Mitchell) **CHI Systems Inc., license for the Bunch Software (\$10,000).**

## Software Patents:

- **2015:** (Mancoridis, Rorres, Stehle, Shevertalov, Lynch) “**Detection, Diagnosis, And Mitigation of Software Faults**”. Patent Issued 2/3/2015. Patent # 8,949,674
- **2017:** (Mancoridis, Canzanese, Kam) “**Behavioral Change-Point Malware Detection System**”. Patent Issued 2/26/2017. Patent # 9,853,997
- **2017:** (Mancoridis, Alsulami, Srinivasan) “**A behavioral host-based online malware detection using Microsoft Windows pre-fetch files**”. Patent Pending.
- **2018:** (Alsulami, Mancoridis) “**Light-weight Behavioral Malware Detection for Windows Platforms**”. Patent Pending.

## Awards and Distinctions

- **2022:** Best Paper: J. Carter, S. Mancoridis, M. Nkomo, S. Weber, K. Dandekar, “System Call Processing Using Lightweight NLP for IoT Behavioral Malware Detection”, *In the Springer Verlag Proceedings of the International Conference on Ubiquitous Security (UbiSec '22)*, Guangzhou, China, December 2022.
- **2019-present:** Auerbach Berger Chair in Cybersecurity
- **2016-present:** Distinguished Professor of Computer Science
- **2016:** Honorary member of Upsilon Pi Epsilon (UPE) honors society
- **2016-present:** Technical Fellow of the Isaac L. Auerbach Cybersecurity Institute
- **2016:** Best student paper: "Don't Trust Your Router: Detecting Compromised Routers" , by A. Darki, A. Duff, Z. Qian, G. Naik, S. Mancoridis, M. Faloutsos. In the *IEEE Proceedings of the 12th International Conference on Emerging Networking Experiments and Technologies CoNEXT'16 Workshop*, Irvine, CA, USA, 2016.
- **2014:** Invited Speaker on the topic of Malware Detection and Classification at Harvard University’s John A. Paulson School of Engineering and Applied Science (lecture recording: [https://video.seas.harvard.edu/media/14\\_04\\_25+Spiros+Mancoridis--+IACS/1\\_0ogmuirj/15996101](https://video.seas.harvard.edu/media/14_04_25+Spiros+Mancoridis--+IACS/1_0ogmuirj/15996101))
- **2009:** Best paper: *Task Dependency of User Perceived Utility in Autonomic VoIP Systems*, by E. Stehle, M. Shevertalov, P. deGrandis, S. Mancoridis, M. Kam. In the Proceedings of the IEEE 4th International Conference on Autonomic and Autonomous Systems (ICAS’08).
- **2008:** Drexel University College of Engineering *Outstanding Research Award*.
- **2003:** Best paper: *Modeling the Search Landscape of Metaheuristic Software Clustering Algorithms*, by B. S. Mitchell, S. Mancoridis. In the AAAI Proceedings of the 2003 Genetic and Evolutionary Computation Conference (GECCO’03).
- **2003:** Invited to attend a Schloss Dagstuhl Workshop at the International Conference and Research Center for Computer Science in Dagstuhl Germany on the subject of *Software Architecture: Modeling and Recovery* (<http://www.dagstuhl.de/Reports/03061>)

- **2001:** Best paper: *CRAFT: A Framework for Evaluating Software Clustering Results in the Absence of Benchmark Decompositions*, by B. S. Mitchell, S. Mancoridis. In the IEEE Proceedings of the 2001 Working Conference in Reverse Engineering (WCRE'01).
- **2001:** Invited to attend a Schloss Dagstuhl Workshop at the International Conference and Research Center for Computer Science in Dagstuhl Germany on the subject of *Interoperability of Reengineering Tools* (<http://www.dagstuhl.de/01041>)
- **2000:** Research Day 2000 – Best Poster Award, Twelfth Annual SIGMA XI Research Day Drexel and MCP Hahnemann Universities (with M. Traverso)
- **1997:** NSF CAREER Award (<http://www.nsf.gov/cgi-bin/showaward?award=9733569>).
- **1993-1995:** IBM Canada Ltd. Center for Advanced Studies (CAS) Research Fellowship
- **1992-1994:** Natural Sciences & Engineering Research Council (NSERC) Postgraduate Scholarship
- **1990-1991:** Open Master's Fellowship, University of Toronto
- **1987-1990:** Acadia University Dean's List Scholarship

### **Ph.D Students:**

- Brian Mitchell (Ph.D.) graduated 2002
- Maher Salah (Ph.D.) graduated 2005
- Ray Canzanese (Ph.D, co-advisor with Moshe Kam) graduated 2015
- Bander Alsulami (Ph.D.) graduated 2019
- Aviel Stein (Ph.D.), graduated 2022
- John Carter (Ph.D. candidate), current
- Erick Galinkin (Ph.D. candidate), current
- Danai Roumelioti (Ph.D. candidate), current

### **M.Sc. Students with Thesis:**

- Beth Randall (M.Sc.) graduated 1999
- Juan Gargiulo (M.Sc.) graduated 2001
- Martin Traverso (M.Sc.) graduated 2001
- Congrong Liao (M.Sc.) graduated 2002
- Christopher Dahn (M.Sc.) graduated 2004
- Maxim Shevertalov (M.Sc.) graduated 2007
- William Mongan (M.Sc.), graduated 2009
- Daniel DaCosta (M.Sc.), graduated 2011
- Saumya Saxena (M.Sc.), graduated 2019
- Mahshid Noornani (M.Sc., co-advisor with Steve Weber), graduated 2019
- Abhilasha Jayaswal (M.Sc.), graduated 2020
- Jeechieu Ta (M.Sc, co-advisor with Anup Das.), graduated 2021

## Archival Publications:

1. E. Galinkin, Emmanouil Poutourakis, J. Carter, S. Mancoridis, “Simulation of Attacker Defender Interaction in a Noisy Security Game”, *In the Proceedings of the 37<sup>th</sup> AAAI Conference on Artificial Intelligence: Artificial Intelligence for Cybersecurity (AAAI-AICS’23)*, Washington CS, February 2023.
2. A. Stein, S. Mancoridis. “Chaos to Clarity with Semantic Inferencing for Python Source Code Snippets”, *IEEE International Conference on Semantic Computing (ICSC’23)*, Laguna Hills CA, February, 2023.
3. J. Carter, S. Mancoridis, M. Nkomo, S. Weber, K. Dandekar, “System Call Processing Using Lightweight NLP for IoT Behavioral Malware Detection”, *In the Springer Verlag Proceedings of the International Conference on Ubiquitous Security (UbiSec ’22)*, Guangzhou, China, December, 2022.
4. J. Carter, S. Mancoridis, E. Galinkin, , “Fast, Lightweight IoT Anomaly Detection Using Feature Pruning and PCA”, *In the 37<sup>th</sup> ACM/SIGAPP Symposium on Applied Computing (SAC’22)*, Virtual, April, 2022.
5. A. Stein, D. Schwartz, Y. Shi, S. Mancoridis. “Linguistic Approach to Segmenting Source Code”, *IEEE International Conference on Semantic Computing (ICSC’22)*, Virtual, January, 2022.
6. E. Galinkin, J. Carter, S. Mancoridis, “Evaluating Attacker Risk Behavior in an Internet of Things Ecosystem”, *In the Springer Verlag Proceedings of the Conference on Decision and Game Theory for Security (GameSec’21)*, Virtual, October 2021.
7. J. Carter, S. Mancoridis, “Evaluation of an Anomaly Detector for Routers using Parameterizable Malware in an IoT Ecosystem”, *In the Springer Verlag Proceedings of the International Conference on Ubiquitous Security (UbiSec ’21)*, Virtual, December, 2021
8. A. Stein, J. Weerasinghe, S. Mancoridis, R. Greenstadt. “News Article Text Classification and Summary for Authors and Topics”, *In the Proceedings of the 9th International Conference on Natural Language Processing (NLP ’20)*, Zurich, Switzerland, November, 2020.
9. A. Stein, L. Kapliani, S. Mancoridis, R. Greenstadt. “Exploring Paraphrasing Techniques on Formal Language for Generating Semantics Preserving Source Code Transformations”, *IEEE International Conference on Semantic Computing (ICSC’20)*, San Diego CA, February, 2020.
10. M. Noorani, S. Mancoridis, S.Weber. “On the Detection of Malware on Virtual Assistants Based on Behavioral Anomalies”, *Proc. 2019 Annual Computer Security Applications Conference (ACSAC’19)*, Short Paper and Poster, San Juan, Puerto Rico, December, 2019.
11. S. Saxena, S. Mancoridis. “Malware Detection Using Behavioral Whitelisting on Computer Systems”, *Proc. 2019 IEEE International Symposium on Technologies for Homeland Security (THS ’19)*, Woburn MA, November, 2019.
12. M. Noorani, S. Mancoridis, S.Weber. “On the Detection of Malware on Virtual Assistants Based on Behavioral Anomalies”, *Proc. 2019 IEEE International Conference on Malicious and Unwanted Software (MALWARE’19)*, Nantucket MA, October, 2019.

13. B. Alsulami, S. Mancoridis. "Behavioral Malware Classification Using Convolutional Recurrent Neural Networks", *Proc. 2018 IEEE International Conference on Malicious and Unwanted Software (MALWARE'18)*, Nantucket MA, October, 2018.
14. N. An, A. Duff, M. Noorani, S. Weber, S. Mancoridis. "Maware Anomaly Detection on Virtual Assistants", *Proc. 2018 IEEE International Conference on Malicious and Unwanted Software (MALWARE'18)*, Nantucket MA, October, 2018.
15. B. Alsulami, S. Mancoridis, A. Srinivasan, H. Dong. "Lightweight Behavioral Malware Detection for Windows Platforms", *Proc. 2017 IEEE International Conference on Malicious and Unwanted Software (MALWARE'17)*, Puerto Rico, October, 2017.
16. N. An, A. Duff, G. Naik, S. Weber, S. Mancoridis, M. Faloutsos, "Behavioral Anomaly Detection of Malware on Home Routers", *Proc. 2017 IEEE International Conference on Malicious and Unwanted Software (MALWARE'17)*, Puerto Rico, October, 2017.
17. B. Alsulami, S. Mancoridis, R. Greenstadt. "Source Code Authorship Attribution using Long-Term Memory Based Networks", *Proc. Springer Verlag of the European Symposium on Research in Computer Security (ESORICS'17)*, Oslo, Norway, September, 2017.
18. A. Darki, A. Duff, Z. Qian, G. Naik, S. Mancoridis, M. Faloutsos. "Don't Trust Your Router: Detecting Compromised Router". In the *IEEE Proceedings of the 12th International Conference on Emerging Networking Experiments and Technologies CoNEXT'16 Student Workshop*, Irvine, CA, USA, 2016.
19. M. Ping, B. Alsulami, S. Mancoridis. "On the Effectiveness of Application Characteristics in the Automatic Classification of Malware Smartphones", *Proc. 2015 IEEE International Conference on Malicious and Unwanted Software (MALWARE'16)*, Puerto Rico, October, 2016.
20. M. Balduccini, S. Mancoridis. Action Languages and the Mitigation of Malware. *Proc. Springer Verlag of the First Workshop on Action Languages, Process Modeling, and Policy Reasoning (ALPP 2015)*, Lexington, Kentucky, USA, September, 2015.
21. R. Canzanese, S. Mancoridis, M. Kam. Run-time Classification of Malicious Processes Using System Call Analysis, *Proc. 2015 IEEE International Conference on Malicious and Unwanted Software (MALWARE'15)*, Puerto Rico, October, 2015.
22. R. Canzanese, S. Mancoridis, M. Kam. System Call-based Detection of Malicious Processes, *Proc 2015 IEEE International Conference on Software Quality Reliability and Security (QRS'15)*, Vancouver, BC, Canada, August, 2015.
23. R. J. Karp, I. Bollendorf, C. Ngo, N. Dahan, R. Johnson, D. Okoye, S. Sheth, S. Mancoridis. Filling, Affordable and Nutritious (FAN): An individualized program to assist poorer families in obtaining sufficient, nutritious food at a reasonable cost, Meetings of the Pediatric Academic Societies. Vancouver, Canada. May 6, 2014.
24. R. Canzanese, M. Kam, S. Mancoridis. Toward an Automatic, Online Behavioral Malware Classification System, *Proc. 7th IEEE International Conference on Self-*

- Adaptive and Self Organizing Systems (SASO '13)*, Philadelphia, PA, USA, September, 2013.
25. R. Canzanese, M. Kam, S. Mancoridis. Multi-Channel Change Point Malware Detection, *Proc. IEEE International Conference on Software Security and Reliability (SERE '13)*, Washington, DC, USA, June, 2013.
  26. E. Stehle, K. Lynch, M. Shevertalov, C. Rorres, S. Mancoridis. Diagnosis of Software Failures Using Computational Geometry, *Proc. IEEE/ACM 26<sup>th</sup> International Conference on Automated Software Engineering (ASE'11)*, Oread Lawrence, Kansas, USA, November, 2011.
  27. M. Shevertalov, S. Mancoridis. On the Maintenance of UI-integrated Mashup Applications, *Proc. IEEE of the 2011 International Conference on Software Maintenance (ICSM'11)*, Williamsburg, VA, USA, September, 2011.
  28. R. Canzanese, M. Kam, and S. Mancoridis, Inoculation against malware infection using kernel-level software sensors, In the *IEEE Proceedings of the International Conference on Autonomic Computing (ICAC'11)*, Karlsruhe, Germany, June, 2011
  29. S. Wong, M. Aaron, J. Segall, K. Lynch, S. Mancoridis: Reverse Engineering Utility Functions Using Genetic Programming to Detect Anomalous Behavior in Software. WCRE 2010, Beverly, Massachusetts, October, 2010, pp. 141-149.
  30. M. Shevertalov, K. Lynch, E. Stehle, C. Rorres, and S. Mancoridis. Using Search Methods for Selecting and Combining Software Sensors to Improve Fault Detection in Autonomic Systems, *Proc. IEEE of the 2nd International Symposium on Search Based Software Engineering (SBSE'10)*, Benevento, Italy, September, 2010.
  31. E. Stehle, K. Lynch, M. Shevertalov, C. Rorres, and S. Mancoridis, On the use of Computational Geometry to Detect Software Faults at Runtime, In the *IEEE Proceedings of the International Conference on Autonomic Computing (ICAC'10)*, Washington DC, USA, June, 2010.
  32. R. Lange and S. Mancoridis. thr2csp: Toward Transforming Threads into Communicating Sequential Processes, In the *IEEE Proceedings of the Source Code Analysis and Manipulation Conference (SCAM'09)*, Edmonton, Canada, September, 2009, pp 3-12.
  33. M. Shevertalov, J. Kothari, E. Stehle, and S. Mancoridis. On the Use of Discretized Source Code Metrics for Author Identification, *Proc. IEEE of the 1st International Symposium on Search Based Software Engineering (SBSE'09)*, Windsor, UK, May, 2009.
  34. C. Nagy and S. Mancoridis. Static security analysis based on input-related software faults, *Proc. IEEE of the 13th European Conference on Software Maintenance and Reengineering (CSMR'09)*, Kaiserslautern, Germany, March, 2009, pp. 37-46.
  35. E. Stehle, M. Shevertalov, P. deGrandis, S. Mancoridis, and M. Kam. "Perception of Utility in Autonomic VoIP Systems", *International Journal on Advances in Intelligent Systems*, Volume 2, No 1, 2009, pp. 92-106.
  36. J. Kothari, D. Bespalov, S. Mancoridis, A. Shokoufandeh. On Evaluating the Efficiency of Software Feature Development Using Algebraic Manifolds, *Proc.*

- IEEE of the 2008 International Conference on Software Maintenance (ICSM'08)*, Beijing, China, September, 2008.
37. S. Mancoridis. Software Analysis for Security, *Proc. IEEE of the 2008 International Conference on Software Maintenance (ICSM'08), Future of Software Maintenance Track*, Beijing, China, September, 2008.
  38. M. Shevertalov, S. Mancoridis. A Case Study on the Automatic Composition of Network Application Mashups, *Proc. IEEE/ACM 23<sup>rd</sup> International Conference on Automated Software Engineering (ASE'08)*, L'Aquila, Italy, September, 2008.
  39. W. Mongan, M. Shevertalov, S. Mancoridis. Re-Engineering a Reverse Engineering Portal to a Distributed SOA, *Proc. IEEE Proceedings of the 16<sup>th</sup> International Conference on Program Comprehension (ICPC'08)*, Amsterdam, The Netherlands, June, 2008.
  40. E. Stehle, M. Shevertalov, P. deGrandis, S. Mancoridis, <sup>[SEP]</sup>M. Kam, Task Dependency of User Perceived Utility in Autonomic VoIP Systems, *Proc. IEEE 4<sup>th</sup> International Conference on Autonomic and Autonomous Systems (ICAS'08)*, Gosier, Guadeloupe, March, 2008.
  41. M. Shevertalov, S. Mancoridis, A Reverse Engineering Tool for Extracting Protocols of Networked Applications, *Proc. IEEE 14<sup>th</sup> Working Conference on Reverse Engineering (WCRE'2007)*, Vancouver, Canada, October, 2007.
  42. D. Binkley, R. Koschke, S. Mancoridis: Guest Editors' Introduction to the Special Section from the International Conference on Software Maintenance and Evolution. *IEEE Trans. Software Eng.* 33(12): 797-798 (2007).
  43. B. S. Mitchell, S. Mancoridis, On the evaluation of the Bunch search-based software modularization algorithm, *Springer-Verlag Journal of Soft Computing*, Volume 12, Number 1, 2007, pp. 77-92.
  44. R. C. Lange, S. Mancoridis, Using Code Metric Histograms and Genetic Algorithms to Perform Author Identification for Software Forensics, *Proc. AAAI Genetic and Evolutionary Computing Conference (GECCO'07)*, London, UK, July 2007.
  45. J. Kothari, T. Denton, A. Shokoufandeh, S. Mancoridis, Reducing Program Comprehension Effort in Evolving Software by Recognizing Feature Implementation Convergence, *Proc. IEEE 15<sup>th</sup> International Conference on Program Comprehension (ICPC'2007)*, Banff, Canada, June, 2007.
  46. M. Shevertalov, E. Stehle, C. Rorres, S. Mancoridis, <sup>[SEP]</sup>M. Kam, An Approach to Comprehending Networked Applications through Analogy, *Proc. IEEE 3<sup>rd</sup> International Conference on Autonomic and Autonomous Systems (ICAS'07)*, Athens, Greece, June, 2007.
  47. J. Kothari, M. Shevertalov, E. Stehle, S. Mancoridis, A Probabilistic Approach to Source Code Authorship Identification, <sup>[SEP]</sup>*Proc. IEEE 5<sup>th</sup> International Conference on Information Technology: New Generations (ITNG'07)*, Las Vegas, USA, April, 2007.
  48. J. Kothari, T. Denton, S. Mancoridis, A. Shokoufandeh, On Computing the Canonical Features of Software Systems, *Proc. IEEE 13<sup>th</sup> Working Conference on Reverse Engineering (WCRE'2006)*, Benevento, Italy, October, 2006.
  49. J. Kothari, T. Denton, A. Shokoufandeh, S. Mancoridis, A. E. Hassan, Studying the Evolution of Software Systems Using Change Clusters, *Proc. IEEE 14<sup>th</sup>*



- International Conference on Program Comprehension (ICPC'2006)*, Athens, Greece, June, 2006.
50. P. J. Modi, S. Mancoridis, W. M. Mongan, W. C. Regli, I. Mayk, Towards a Reference Model for Agent-Based Systems, *Proc. of the 5<sup>th</sup> International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS'06)*, (Industry Track), Japan, May 2006.
  51. B. S. Mitchell, S. Mancoridis, On the Automatic Modularization of Software Systems Using the Bunch Tool, *IEEE Transactions on Software Engineering*, Volume 32, Number 3, 2006, pp. 193-208.
  52. M. Salah, S. Mancoridis, G. Antoniol, M. Di Penta, Scenario-Driven Dynamic Analysis for Comprehending Large Software Systems, *Proc. IEEE 10th European Conference on Software Maintenance and Reengineering (CSMR'06)*, Bari, Italy, March, 2006.
  53. M. Salah, T. Denton, S. Mancoridis, A. Shokoufandeh, F. Vokolos, Scenariographer: A Tool for Reverse Engineering Class Usage Scenarios from Method Invocation Sequences. *Proc. IEEE 2005 International Conference on Software Maintenance (ICSM'05)*, Budapest, Hungary, September, 2005.
  54. M. Salah, S. Mancoridis, G. Antoniol, M. Di Penta, Towards Employing Use-cases and Dynamic Analysis to Comprehend Mozilla. *Proc. IEEE 2005 International Conference on Software Maintenance (ICSM'05)*, Budapest, Hungary, September, 2005.
  55. J. Haas, M. Peysakov, V. Cicirello, S. Mancoridis, GA-based Parameter Tuning for Multi-Agent Systems (short Paper), *Proc. AAAI 9th Annual Genetic and Evolutionary Computing Conference (GECCO'05)*, Washington, DC, USA, June 2005.
  56. A. Shokoufandeh, S. Mancoridis, T. Denton, M. Maycock, Spectral and Meta-Heuristic Algorithms for Software Clustering, *Journal of Systems and Software*, Vol. 77, pp. 213-223, 2005.
  57. C. Dahn, S. Mancoridis, Automatically Transforming GNU C Source Code. *Proc. 1<sup>st</sup> International Workshop on Software Evolution Transformations (SET'04)*, Delft, the Netherlands, November, 2004.
  58. M. Salah, S. Mancoridis, Reverse Engineering of a Hierarchy of Dynamic Software Views: From Object Interactions to Feature Dependencies. *Proc. IEEE 2004 International Conference on Software Maintenance (ICSM'04)*, Chicago, USA, September, 2004.
  59. B. S. Mitchell, S. Mancoridis, Using Interconnection Style Rules to Infer Software Architecture Relations, *Proc. AAAI 8th Annual Genetic and Evolutionary Computing Conference (GECCO'04)*, Seattle, USA, July 2004.
  60. C. Dahn, S. Mancoridis, Using Program Transformation to Secure Against Buffer Overflows, *Proc. IEEE 2003 Working Conference in Reverse Engineering (WCRE'03)*, Victoria, BC, Canada, 2003.
  61. M. Salah, S. Mancoridis, Toward an environment for comprehending distributed systems, *Proc. IEEE 2003 Proceedings of the Working Conference in Reverse Engineering (WCRE'03)*, Victoria, BC, Canada, 2003.
  62. D. DaCosta, C. Dahn, S. Mancoridis, V. Prevelakis, Characterizing the Security Vulnerability Likelihood of Software Functions *Proc. IEEE 2003 International*

- Conference on Software Maintenance (ICSM'03)*, Amsterdam, The Netherlands, September, 2003.
63. J. Clark, J. J. Dolado, M. Harman, R. Hierons, B. Jones, M. Lumkin, B. S. Mitchell, S. Mancoridis, K. Rees, M. Roper, M. Shepperd, Reformulating Software Engineering as a Search Problem, *Journal of IEE Proceedings - Software*, 150(3): 161-175, 2003.
  64. G. W. Hislop, S. Mancoridis, P. M. Shankar, A Collaborative Bachelor's Degree in Software Engineering, *Proc. IEEE/ASEE 2003 Proceedings of the Frontiers in Education Conference (FIE'03)*, Boulder, Colorado, November, 2003.
  65. B. S. Mitchell, S. Mancoridis. Modeling the Search Landscape of Metaheuristic Software Clustering Algorithms, *Proc. AAI 7th Annual Genetic and Evolutionary Computing Conference (GECCO'03)*, Chicago, USA, July 2003. (BEST PAPER AWARD).
  66. D. DaCosta, C. Dahn, S. Mancoridis, V. Prevelakis, Demonstration of CoSAK Static Analysis Tools, *DARPA Information Survivability Conference and Exposition – DISKEX 2003*, Washington, DC, 2003.
  67. A. Shokoufandeh, S. Mancoridis, M. Maycock . Applying Spectral Methods to Software Clustering, *Proc. IEEE 2002 Working Conference in Reverse Engineering (WCRE'02)*, Richmond, VA, USA, October, 2002, pp 3-10.
  68. M. Traverso, S. Mancoridis, On the Automatic Recovery of Style-Specific Structural Dependencies in Software Systems, *Journal of Automated Software Engineering*, Kluwer Academic Publishers, Volume 9, Number 3, 2002. pp. 331-360.
  69. B. S. Mitchell, S. Mancoridis, M. Traverso. Search Based Reverse Engineering, *Proc. ACM 2002 International Conference on Software Engineering and Knowledge Engineering (SEKE'02)*, Ischia, Italy, July, 2002. pp. 431-438.
  70. B. S. Mitchell, S. Mancoridis, Using Heuristic Search Techniques to Extract Design Abstractions from Source Code, *Proc. AAI 2002 Genetic and Evolutionary Computing Conference (GECCO'02)* , NY, USA, July, 2002. pp. 1375-1382.
  71. A. Buchsbaum, Y. Chen, H. Huang, M. Jankowsky, E. Koutsofios, S. Mancoridis, J. Mocenigo, A. Rogers, Enterprise Navigator: A System for Visualizing and Analyzing Software Infrastructures, *IEEE Software*, Vol 18, Number 5, October 2001. pp 62-70.
  72. B. S. Mitchell, S. Mancoridis , Comparing the Decompositions Produced by Software Clustering Algorithms using Similarity Measurements, *Proc. IEEE 2001 International Conference on Software Maintenance (ICSM'01)*, Florence, Italy, November, 2001. pp 744-753.
  73. T. S. Souder, S. Mancoridis, M. Salah , Form: A Framework for Creating Views of Program Executions, *Proc. IEEE 2001 International Conference on Software Maintenance (ICSM'01)*, Florence, Italy, November, 2001. pp. 612-620.
  74. B. S. Mitchell, S. Mancoridis , CRAFT: A Framework for Evaluating Software Clustering Results in the Absence of Benchmark Decompositions, *Proc. IEEE 2001 Working Conference in Reverse Engineering (WCRE'01)*, Stuttgart, Germany, October, 2001. pp 93-102. (BEST PAPER AWARD)

75. S. Mancoridis, T. S. Souder, Y-F. Chen, E. R. Gansner, J. L. Korn , REportal: A Web-based Portal Site for Reverse Engineering, *Proc. IEEE 2001 Working Conference in Reverse Engineering (WCRE'01)*, Stuttgart, Germany, October, 2001. pp 221-230.
76. B. S. Mitchell, M. Traverso, S. Mancoridis, An Architecture for Distributing the Computation of Software Clustering Algorithms, *Proc. 2001 IEEE/IFIP Working Conference on Software Architecture (WICSA'01)*, Amsterdam, Netherlands, August, 2001. pp 181-190.
77. J. Gargiulo, S. Mancoridis, Gadget: A Tool for Extracting the Dynamic Structure of Java Programs, *Proc. 2001 International Conference on Software Engineering and Knowledge Engineering (SEKE'01)*, Buenos Aires, Argentina, June, 2001. pp. 244-251.
78. T. Hewett, S. Mancoridis, Psychology as Reverse Engineering, Society for Computers in Psychology Symposium, New Orleans, USA, November, 2000.
79. T.S.Souder, S. Mancoridis, A Tool for Securely Integrating Legacy Systems into a Distributed Environment, *Proc. 1999 IEEE Working Conference in Reverse Engineering (WCRE'99)*, Atlanta, GA, October, 1999. pp 47-55.
80. G.W.Hislop, S. Mancoridis, P.M.Shankar, Creating a Jointly Sponsored Master of Science in Software Engineering, *Proc. 1999 IEEE/ASEE Frontiers in Education Conference (FIE'99)*, San Juan, Puerto Rico, November, 1999. pp. 13A3/7-13A311
81. S. Mancoridis, B.S.Mitchell, Y.Chen, E.R.Gansner, Bunch: A Clustering Tool for the Recovery and Maintenance of Software System Structures, *Proc. 1999 IEEE Intl. Conference on Software Maintenance (ICSM'99)*, Oxford, UK, August, 1999. pp 50-59.
82. D. Doval, S. Mancoridis, B.S.Mitchell, Automatic Clustering of Software Systems using a Genetic Algorithm, *Proc. 1999 IEEE Intl. Workshop on Software Tools and Engineering Practice (STEP'99)*, Pittsburgh, PA, August, 1999. pp. 73-81.
83. S. Mancoridis, B.S.Mitchell, C.Rorres, Y.Chen, E.R.Gansner, Using Automatic Clustering to Produce High-Level System Organizations of Source Code, *Proc. 1998 IEEE Intl. Workshop on Program Understanding (IWPC'98)*, Ischia, Italy, June, 1998. pp. 45-52.
84. S. Mancoridis, ISF: A Visual Formalism for Specifying Interconnection Styles for Software Design, *Intl. Journal of Software Engineering and Knowledge Engineering (IJSEKE)*, Vol. 8 No. 4, 1998, pp 517-540, World Scientific Publishing Company.
85. S. Mancoridis, R.C.Holt, Algorithms for Managing the Evolution of Software Designs, *Proc. 1998 Intl. Conf. on Software Engineering and Knowledge Engineering (SEKE'98)*, San Francisco, CA, June, 1998. pp. 367-374.
86. H. Fahmy, R. C. Holt, S. Mancoridis, Repairing Software Style using Graph Grammars, *Proc. 7<sup>th</sup> IBM Centre for Advanced Studies Conf. (CASCON'97)*, November, 1997.
87. S.Mancoridis, Customizable Notations for Software Design, *Proc. 9<sup>th</sup> Intl. Conf. on Software Engineering and Knowledge Engineering (SEKE'97)*, June, 1997. pp. 318-325. (Selected as one of the BEST PAPERS)

88. S.Mancoridis, R.C.Holt, Recovering the Structure of Software Systems Using Tube Graph Interconnection Clustering, *Proc. 1996 IEEE Intl. Conf. on Software Maintenance (ICSM'96)*, November, 1996. pp. 23-32.
89. S. Mancoridis, Toward a Generic Framework for Computing Subsystem Interfaces, *Proc. 2<sup>nd</sup> IEEE Intl. Workshop on Software Architecture (IWSA '96)*, October, 1996. pp 42-56.
90. S.Mancoridis, R.C.Holt, On Controlling the Interactions of Software Components: An Evolutionary Perspective, *Proc. 1996 Conf. on Software Engineering and its Application*, August, 1996.
91. S.Mancoridis, R.C.Holt, Extending Programming Environments to Support Architectural Design, *Proc. 7<sup>th</sup> IEEE Intl. Workshop on Computer-Aided Software Engineering (CASE'95)*, July, 1995. pp. 110-119.
92. S.Mancoridis, Loosely Integrating Tools Using the Star System, *Proc. 4<sup>th</sup> IBM Centre for Advanced Studies Conf. (CASCON'94)*, November, 1994.
93. S. Mancoridis, R. C. Holt, M. W. Godfrey, Tool Support for Software Engineering Education, *Proc. 16<sup>th</sup> IEEE Intl. Conf. on Software Engineering (ICSE'16) Workshop on Software Engineering Education*, May, 1994.
94. M. W. Godfrey, R. C. Holt, S. Mancoridis, Prototyping a Visual Formalism for Configuration Management, *Proc. 16<sup>th</sup> IEEE Intl. Conf. on Software Engineering (ICSE'16) Workshop on Software Engineering and Human-Computer Interaction*, May, 1994. (Also published as Lecture Notes in Computer Science vol.896, Springer Verlag, Feb. 1995.)
95. S. Mancoridis, R. C. Holt, M. W. Godfrey, A Program Understanding Environment Based on the Star approach to Tool Integration, *Proc. 22<sup>nd</sup> ACM Computer Science Conf. (CSC'94)*, March, 1994.
96. S.Mancoridis, A Multi-Dimensional Taxonomy of Software Development Environments, *Proc. 3<sup>rd</sup> IBM Center for Advanced Studies Conf. (CASCON'93)*, November, 1993.
97. S. Mancoridis, R. C. Holt, D. A. Penny, A Conceptual Framework for Software Development, *Proc. 21<sup>st</sup> ACM Computer Science Conf. (CSC'93)*, February, 1993.
98. S. Mancoridis, R. C. Holt, D. A. Penny, A Curriculum-Cycle Environment for Teaching Programming, *Proc. 24<sup>th</sup> ACM Special Interest Group in Computer Science Education (SIGCSE'93) Technical Symposium on Computer Science Education*, February, 1993.
99. R. C. Holt, D. A. Penny, S. Mancoridis, Multicolour Programming and Metamorphic Programming: Object-Oriented Programming-in-the-Large, *Proc. 2<sup>nd</sup> IBM Centre for Advanced Studies Conf. (CASCON'92)*, November, 1992.

### **Technical Report Publications:**

1. A. Buchsbaum, Y. Chen, H. Huang, M. Jankowsky, E. Koutsofios, S. Mancoridis, J. Mocenigo, A. Rogers, Enterprise Navigator: A System for Visualizing and Analyzing Software Infrastructures, *AT&T Labs – Research Technical Report, Number TR-99.16.1*, 1999.
2. R. C. Holt, S. Mancoridis, Using Tube Graphs to Model Architectural Designs of Software Systems, *Computer Systems Research Institute University of Toronto, Technical Report, Number 308*, October, 1994.

3. S. Mancoridis, R. C. Holt, M. W. Godfrey, Tool Support for Software Engineering Education, *Imperial College of London Technical Report, Number TR 94/6*, June, 1994. (Also appears in the Proceedings of the Sixteenth International Conference on Software Engineering Workshop on Software Engineering Education.)
4. R. C. Holt, S. Mancoridis, A Framework for Specifying and Visualizing Architectural Designs, *Computer Systems Research Institute University of Toronto Technical Report, Number 300*, June 1994. (Also appears as an *IBM Technical Report, Number TR-74.142*, July, 1994.)
5. R. C. Holt, D. A. Penny, S. Mancoridis, Multicolour Programming and Metamorphic Programming: Object-Oriented Programming-in-the-Large, *IBM Technical Report, Number TR-74.087*, March, 1992. (Also appears in the Proceedings of the Second IBM Center for Advanced Studies Conference.)

### **Book Chapter Publications:**

1. R. C. Holt, S. Mancoridis, D. A. Penny, Using the Turing Language Across the Curriculum, *Chapter in Programming Language Choice: Practice and Experience* (Mark Woodman ed.), Intl. Thompson Computer Press London, U.K., 1996.
2. M. Nassar, S. Mancoridis, Fundamental Data Structures and Algorithms, *Wm. C. Brown Publishers*, Dubuque, Iowa 52001, USA, 1992.

### **Software:**

- **Bunch:** Bunch is a software clustering tool. Its input is a module dependency graph that consists of nodes (e.g., modules, files, classes) and edges (e.g., method invocations, inheritance relationships between classes). Bunch's output is a hierarchical decomposition of the system structure where closely related modules are grouped into clusters that are loosely connected to other clusters. This decomposition produces a high-level map, which software engineers can use to navigate through the complex structure of large software systems. Bunch has had a widespread impact in **a)** classrooms (University of California – Riverside, University of Wisconsin – Milwaukee, Waterloo University), **b)** research labs (AT&T Labs - Research, University of Ottawa, University of Toronto), and **c)** industry (CHI Systems, AT&T). More information about Bunch can be found at: <http://www.cs.drexel.edu/~spiros>

### **Professional Service:**

#### **Conference General Chair:**

- **2006:** *IEEE International Conference on Software Maintenance (ICSM'06)*, September 2006, Philadelphia, USA.

#### **Conference Program Committee Chair:**

- **2005:** *AAAI Genetic and Evolutionary Computation Conference (GECCO'05) Track on Search-Based Software Engineering (SBSE)*, June 2005, Washington, USA.

#### **Associate Editor:**

- **2011-2019:** *Journal of Software Maintenance and Evolution: Research and Practice*

#### **Conference Program Committees:**

- **2023-:** *International Conference on Computer Communications (INFOCOM AD-driven trustworthy secure and privacy preserving computing AidTSP Workshop)*
- **2022- :** *Conference on Conference on Decision and Game Theory for Security (GameSec)*
- **2019-2022:** *IEEE International Conference on Trust, Security and Privacy in Computing and Communications (TrustComm)*
- **2021-2022:** *The Springer Verlag International Conference on Ubiquitous Security (UbiSec 2021)*
- **2017-2019:** *IEEE Conference on Malware (MALCON).*
- **2009-2015:** *IEEE Symposium on Search Based Software Engineering (SBSE).*
- **2004-2007, 2009-2013:** *IEEE International Conference on Software Maintenance (ICSM).*
- **2002-2015:** *AAAI Genetic and Evolutionary Computation Conference (GECCO) Track on Search-Based Software Engineering (SBSE).*
- **2002-2014:** *IEEE International Working Conference in Reverse Engineering (WCRE).*
- **2007-2011:** *IEEE International Conference on Program Comprehension (ICPC).*
- **2006-2007:** *IEEE International Workshop on Source Code Analysis and Manipulation (SCAM).*
- **2004-2010:** *IEEE European Conference in Software Maintenance and Reengineering (CSMR).*
- **2006:** *CEC Track of the IEEE World Congress on Computational Intelligence (WCCI).*
- **2003:** *IEEE International Workshop on Principles of Software Evolution (IWPSE).*
- **2004:** *IEEE Workshop on Software Evolution Transformations (SET).*
- **1999:** *IEEE Software Tools and Engineering Practice Conference (STEP).*

#### **Other Conference Committees:**

- **2013:** *Research Demonstrations Committee Member for the International Conference on Software Engineering, (ICSE'2013), San Francisco, USA, 2013.*
- **2006-2009:** *International Conference on Software Maintenance (ICSM) Steering Committee.*
- **2009-2011:** *International Conference on Search Based Software Engineering (SSBSE) Steering Committee.*
- **2009:** *IEEE International Working Conference in Reverse Engineering (WCRE) Doctoral Symposium co-chair.*
- **2007:** *Workshop Co-chair for the workshop entitled Code Based Software Security Assessments (CoBaSSA), October, 2007, Vancouver, Canada.*

- **2005:** Workshop Co-chair for the workshop entitled Code Based Software Security Assessments (CoBaSSA), November, 2005, Pittsburgh, PA.
- **2004:** Dissertation Forum co-Chair for the *IEEE International Conference on Software Maintenance (ICSM'04)*, September, 2004, Chicago, USA.
- **2004:** Workshops Committee Member for the *International Conference on Software Engineering, (ICSE'2004)*, Edinburgh, Scotland, 2004.
- **2001:** Exhibits and Tools Fair Committee Member for the *International Conference on Software Engineering, (ICSE'2001)*, Toronto, Canada, 2001.
- **1999:** Workshop Chair for the workshop entitled *Software Clustering at the Software Tools and Engineering Practice, (STEP'99)*, August, 1999.
- **1995:** Workshop Co-chair for the workshop entitled *Architecture-Based CASE Systems at the 7<sup>th</sup> Intl. Workshop on Computer-Aided Software Engineering (CASE'95)*, July, 1995.
- **1994:** Workshop Co-chair for the workshop entitled *C++ Compiler-Based Development Environments at the 4<sup>th</sup> IBM Centre for Advanced Studies, Conference (CASCON'94)*, October, 1994.
- **1993:** Tutorial Co-Presenter for the tutorial entitled *Object-Oriented Development Environments at the 3<sup>rd</sup> IBM Centre for Advanced Studies Conference (CASCON'93)*, October, 1993.

### **Funded Research Grants:**

- **2022-2024:** (PI: Weber, co-PIs: Dandekar, Mancoridis), Grant #950048 Title: FAA ASSURE A58, **(\$608,783)**, *Illustrate the Need for UAS Cybersecurity Oversight and Risk.*
- **2018-2021:** (PI: Fontecchio, co-PIs: Weber, Dandekar, Mancoridis, Johnson, Greenstadt, Stanford), 001778: US Department of Education, **(\$746,250 + \$477,698 cost share = \$1,223,948)**, *GAANN Cybersecurity.*
- **2016-2019:** (PI: Mancoridis), Isaac L. Auerbach Cybersecurity Technical Fellowship **(\$60,000)**, *Malware Protection.*
- **2015-2017:** (PI: Mancoridis, co-PIs: Weber, Kandasamy, Sethu, COMCAST **(\$200,000)**, *VoD Quality using machine learning and big data analytics.*
- **2014-2015:** (PI: Balduccini, co-PIs: Mancoridis, Kandasamy, Nwankpa, Drexel IeXE institute **(\$50,000)**, *Robustness testing of Smart Grids.*
- **2013-2014:** (PI: Mancoridis, co-PIs: Balduccini, Cyber Security Research Alliance **(\$60,000)**, *Roots of Trust in Electric Energy Generation and Distribution.*
- **2012-2016:** (PI: Weber, co-PIs: Mancoridis, Sethu, Dandekar) NSF-CISE-CNS 1228847 **(\$1,080,000)**, *TTP: Medium: Securing Wireless Philadelphia Network.*
- **2011-12:** (PI: Mancoridis) federal Aviation Administration (FAA) **(\$40,000)** *On the Application of Anomaly Detection Algorithms to Support TAA NextGen.*
- **2010-12:** (PI: Regli, co-PIs: Dandekar, Mancoridis, Naik) United States Army Research Office, Defense University Research Instrumentation Program (DURIP) (AFOSR-BAA-2009-F), Grant#57654-NS-RIP, Contract#W911NF-10-1-0249 **(\$150,000)** *NEER-IP: A Network Emulation Environment for Research In-the-loop*
- **2008-11:** (PI: Mancoridis) Lockheed-Martin Corporation **(\$500,000)** *Toward the Automatic Diagnosis and Mitigation of Failures in SOA Services.*

- **2008-09:** (PI: Mancoridis) Lockheed Martin Corporate Systems and Software Initiative (SSI) (**\$150,000**) Chimera. Subcontract from Lockheed Martin ATL (PI: Daniel Waddington).
- **2007-09:** (PI: Mancoridis) Lockheed Martin Corporate Systems and Software Initiative (SSI) (**\$157,993**) Astraeus Multi-core Experimentation Test bed. Subcontract from Lockheed Martin ATL (PI: Daniel Waddington).
- **2007:** (PI: Mancoridis) U.S. Air Force Research Lab AFRL/IFKD Contract No. FA8750-07-C-0190 (**\$50,000**) *Optimal Configuration and Development of Software on Multi-core Processing Architectures*. Subcontract from Lockheed Martin ATL (PI: Daniel Waddington).
- **2005-2009:** (PI: Mancoridis, co-PI: Kam) Department of Defense DARPA IPTO BAA 04-32 Situation-Aware Protocols in Edge Network Technologies (SAPIENT) (**\$1,420,484**). *Synthesizing Adaptive Protocols by Selective Enumeration (SYNAPSE)*. Subcontract from Lockheed Martin ATL (PIs: Lardieri, Gelfand) total project budget: (**\$10,636,594**).
- **2000-2011:** (PI: Kam, Regli, co-PIs: Mancoridis, et al) U.S. Army, Communications and Electronics Command (CECOM), Fort Monmouth, NJ, FY 2005 sub-award under DoD contract DAAB07-01-9-L504 (approximately **\$10,000,000**). *Title: Applied Communications and Information Networking (ACIN)*.
- **2006-2007:** (PI: D'Ovidio, Co-PI: Mancoridis) U.S. Department of Justice (DoJ) Edward Byrne Grant (**\$50,000**), *Detection of Software Copyright Infringement*.
- **2004-2007:** (PI: Mancoridis, Co-PI: Kam) Software Reverse Engineering Tools (**\$150,000**), *Lockheed-Martin Corporation*.
- **2001-2003:** (PI: Mancoridis, Co-PI: Prevelakis) Department of Defense Information Technology Office F30602-01-20534 (**\$622,873**). *CoSAK-Code Security Analysis Kit*.
- **2000-2003:** (PI: Mancoridis, Co-PIs: Regli, Char, Greenwald) NSF CISE Instrumentation Grant Program (**\$161,973**), *A Multidisciplinary Design Testbed for Research and Education* (CISE-9986015).
- **1998-2002:** (PI: Mancoridis) NSF CISE CAREER Award (**\$269,000**), *Toward a Design Environment for Recovering and Maintaining the Structure of Software Systems* (CISE-9733569) includes REU supplements.
- **1999-2002:** (PI: Mancoridis, Co-PI: Regli) Sun Microsystems Inc Academic Equipment Grant (AEG) Program (**\$113,470**), *A Laboratory for Distributed Computer-aided Software and Engineering Design*.
- **1998-2000:** (PI: Mancoridis) AT&T Labs -Research University Affiliates Program (**\$48,000**) *Clustering Algorithms for Partitioning Graphs* (Year 1), *Using Distributed Algorithms to Cluster Large Software Structure Graphs* (Year 2), *Integrating Tools for Reverse Engineering Software Systems* (Year 3).
- **1996-1997:** (PI: Mancoridis) Devereux Research Grant (**\$5,000**), *On the Synthesis of High-level Software Structure Interconnections from Low-level Implementation Dependencies*.

### **Philanthropic Fund Raising as interim Dean:**

- **2015-2016:** Gift by Carol Auerbach to Drexel University (**\$3,000,000**).



- **2015-2016:** Miscellaneous gifts to the College of Computing & Informatics at Drexel University (**\$1,500,000**).