

GEORGE BERG

Cybersecurity Department
College of Emergency Preparedness, Homeland
Security, and Cybersecurity, ETEC 350
University at Albany, SUNY
Albany, NY 12222
Voice: 1-518-250-9039
gberg@albany.edu

Education

- August 1988 Ph.D., Computer Science, Northwestern University. Dissertation Title: *A Massively Parallel Natural Language Processing Architecture with Distributed Control*, Advisor: Prof. Gilbert K. Krulee
- August 1985 M.S., Computer Science, Northwestern University. Thesis Title: *A Parallel and Heuristic Model for Natural Language Processing*.
- June 1982 B.A., Economics and Computer Studies, Northwestern University

Academic Experience

- August 2024 – Present Fellow, Honors College of the University at Albany – State University of New York.
- July 2023 – Present Associate Professor, Cybersecurity Department, College of Emergency Preparedness, Homeland Security, and Cybersecurity (CEHC), The University at Albany – State University of New York.
- July 2022 – June 2023 Department Head, Cybersecurity Department, CEHC, The University at Albany – State University of New York.
- September 2021 – June 2022 Program Head - Cybersecurity, CEHC, The University at Albany – State University of New York.
- September 2021 – June 2022 Associate Dean (Split Position), CEHC, The University at Albany – State University of New York.
- September 2013 – May 2016 Department Head, Informatics Department, The University at Albany – State University of New York.
- September 2006 – August 2012 Department Head, Computer Science Department, The University at Albany – State University of New York.

September 2018 – June 2023	Associate Professor, College of Emergency Preparedness, Homeland Security, and Cybersecurity, The University at Albany – State University of New York.
September 2018 – Present	Joint Faculty appointment, Department of Computer Science, College of Engineering and Applied Sciences, The University at Albany – State University of New York.
September 1994 – September 2018	Associate Professor, Department of Computer Science, College of Engineering and Applied Sciences, The University at Albany – State University of New York.
June 2017 – September 2018	Joint Faculty appointment, College of Emergency Preparedness, Homeland Security and Cybersecurity.
September 1988 – August 1994	Assistant Professor, Department of Computer Science, The University at Albany – State University of New York.

Peer-Reviewed Publications

Munasinghe, T., Cornell, K.A., **Berg G.**, Hendler, J., and Wei, J.C.

“Position: Why Knowledge Graphs are Necessary Tools for Quantum Machine Learning Applications,” 2025. Submitted to International Conference on Machine Learning (ICML). Under review

Munasinghe, T., Cornell, K.A., Wei, J.C., Berg, G., and Hendler, J.

“A Knowledge Graph Framework for Organizing Heterogeneous Datasets for Utilization in Classical and Quantum Computing: Current Challenges and Future Directions.” In 2024 IEEE International Conference on Big Data (BigData), pages 8781–8785, 2024. <https://ieeexplore.ieee.org/document/10826005> and <https://ntrs.nasa.gov/citations/20240015060>

Lawson, C., **Berg, G.**, Weisbrod, R., and Stern, E. (2019) “Using 3D Printing, Commodity Hardware, Design Thinking, and Modular Architecture to Create Inexpensive Maritime Weather Stations to Extend Ferry Safety and Meteorological Data Gathering” Proceedings of the First International Conference on 3D Printing and Transportation. Washington, DC, November 20-21, 2019.

Nussbaum, B., and **Berg, G.** (2022) “Cybersecurity Implications of Commercial Off The Shelf (COTS) Equipment in Space Infrastructure;” p.91-99. In Space Infrastructures: From Risk to Resilience Governance. Tatar U, Gheorge AV, Keskin OF, Muylaert J, editors. Clifton, VA: IoS Press.

Goel, S., Pon, D., Bloniarz, P., Bangert-Drowns, R., Iwan, L., Hurbaneck, T., **Berg, G.**, Delio, V., Schuman, S., Gangolly, J., Baykal, A., and Hobbs, J. (2006) “Innovative Model for Information Assurance Curriculum: A Teaching Hospital.” *ACM Journal of Educational Resources in Computing*. Vol. 6, Num 3.

Berg, G., Davidson, I., Duan, M. and Paul, G. (2003) “Searching Hidden Messages: Automatic Detection of Steganography.” Proceedings of the Fifteenth Innovative Applications of Artificial Intelligence Conference (IAAI-2003).

J. S. Fetrow and **G. Berg** (1999) "Using Information Theory to Discover Side Chain Rotamer Classes: Analysis of the Effects of Local Backbone Structure". Proceedings of the Fourth Pacific Symposium on Biocomputing, pp. 278-289, R. B. Altman, K. Lauderdale, A. K. Dunker, L. Hunter and T. E. Klein, eds.

J. S. Fetrow, M. J. Palumbo and **G. Berg** (1997) "Patterns, Structures, and Amino Acid Frequencies in Structural Building Blocks, a Protein Secondary Structure Classification Scheme". *PROTEINS: Structure, Function and Genetics*, 27:249-271.

P. Bonissone, L. Rau and **G. Berg** (1994) "The Case for Nonconnectionist Associative Retrieval in Case-Based Reasoning Systems", in *Advances in Connectionist and Neural Computation Theory; Volume 3: Analogy, Metaphor and Reminding*, K. Holyoke and J. Barnden (Eds.). pp. 169{202, Ablex, 1994.

X. Zhang, J. S. Fetrow, D. L. Waltz, W. A. Rennie and **G. Berg**, (1993) "Automatic Derivation of Substructures Yields Novel Structural Building Blocks in Globular Proteins", Proceedings of the First International Conference on Intelligent Systems for Molecular Biology, pp. 438-446.

G. Berg (1992) "A Connectionist Parser with Recursive Sentence Structure and Lexical Disambiguation", Proceedings of the Tenth National Conference on Artificial Intelligence (AAAI-92), pp. 32-37.

G. Berg (1992) "Representational Adequacy and the Case for a Hybrid Connectionist/Marker-Passing Model", in *Connectionist Approaches to Language Processing*, R. Reilly and N. Sharkey (Eds.). Lawrence Erlbaum, pp. 253-272.

J. E. Rager and **G. Berg** (1990) "A Connectionist Model of Motion and Government in Chomsky's Government-Binding Theory", *Connection Science*, special issue on "Connectionist Natural Language Processing", 2:35-52.

Reprinted in *Connectionist Natural Language Processing: Readings from Connection Science*, N. Sharkey (Ed.). pp. 28-45, Kluwer, 1992.

G. Berg (1991) "Learning Recursive Phrase Structure: Combining the Strengths of PDP and X-Bar Syntax", Proceedings of the IJCAI 1991 Workshop on Natural Language Learning. pp. 2-9.

G. Berg (1987) "A Parallel Natural Language Processing Architecture with Distributed Control", Proceedings of the Ninth Annual Conference of the Cognitive Science Society, Seattle, WA, pp. 487-495.

Grants and Awards

National Science Foundation CISE CPATH Program award CNS 0939137. "CPATH-2: Learning Computational Thinking in Context: Using Problems and Cases in Financial Market Regulation." **PI: G. Berg**, co-PIs: R. Bangert-Drowns, S. Chengular-Smith, D. MccAffrey, T. Pardo, Associated Senior Personnel: P. Bloniarz and S. Schuman. \$799,000 10/1/2009. – 9/30/2012.

US Dept. of Ed Fund for the Improvement of Post-Secondary Education (FIPSE) program. "The Information Security Academy: A Partnership Model for Building Public Sector Capacity." PI: P. Bloniarz, Investigators: R. Bangert-Drowns, **G. Berg**, R. Erbacher, J. Gangolly B. Gironda, and S. Goel. \$485,833. 09/2002- 08/2005.

National Science Foundation Award DUE 94-52148 "A Laboratory to Improve the Programming Skills of Computer Science Majors" a Proposal to the National Science Foundation's Instrumentation and Laboratory Infrastructure Program. PI: T. Narten, co-PIs: **G. Berg** and A. Haas. \$38,000, matched by the University at Albany. May 1994.

National Science Foundation Award BIR 92-11256 *Advanced Computational Methods to Predict Protein Secondary and Tertiary Structure*, Joint award with Prof. J. Fetrow. Two year, \$60,000 award. Matched by \$12,000 from the University at Albany. December 1992.

Professional Experience

July 1985 – June 1986	Research Assistant, Department of Electrical Engineering and Computer Science, Northwestern University. Oversaw operations of the Artificial Intelligence Laboratory for Professor G. K. Krulee.
Summer 1983, Summer 1984	Graduate Summer Hire, International Business Machines Corporation, Research Triangle Park, NC. Served as system programmer in a research group headed by IBM Fellow E. H. Sussenguth. Specialized in hardware/software interface work.
Summer 1982	Developed synchronous and asynchronous graphics input routines for an implementation of CORE standard graphics. Computer Science Research Laboratory, Department of Electrical Engineering and Computer Science, Northwestern University

Honors

May 2015, the University at Albany Excellence in Academic Service Award (and subsequently the SUNY Chancellor's Award for Excellence in Academic Service).

May 2010, the University at Albany Excellence in Teaching Award (and subsequently the SUNY Chancellor's Award for Excellence in Teaching).

Recent Invited Talks

September 2019	Panelist on the topic "Enter the Data Scientists" as part of the New York State Digital Government Summit. September 12-13, 2019, Albany, NY. (https://events.govtech.com/new-york-digital-government-summit.html)
June 2019	Invited speaker at the 14 th Annual Symposium on Information Assurance, part of the 21 st Annual New York Cyber Security Conference, Albany, NY. Topic: <i>The State of the Art in Intrusion Detection</i> .
June 2018	Invited speaker at the 13 th Annual Symposium on Information Assurance, part of the 21 st Annual New York Cyber Security Conference, Albany, NY. Topic: <i>Machine Learning: What Is It, and Will It Help Cybersecurity, or Is It Just Another Thing To Be Attacked?</i>

Select PhD Students

Current	Thilanka Munasinghe. Ph.D. student in Information Science. Co-advised with KA Cornell.
Current	Marilyn Kienzle. Ph.D. student in Information Science.
Current	Ellie S. Jung. Ph.D. student in Information Science.
2006	Ian Mac Donald. Ph.D. in Computer Science. Dissertation Title: "A Mixture of Experts Approach to Protein Structural Domain Boundary Classification."

2000	Chi-Chung Kao. Ph.D. in Information Sciences. Dissertation Title: “An Information-theoretic Approach to Artificial Neural Networks: Applications in Geographic Information Processing.”
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Relevant Professional Service

Spring 2025	Reviewer for the external evaluation of the Computer Science Department at Marist University.
Spring 2023	Reviewer for the external evaluation of the Department of Information Science and Technology at George Mason University.
March 2018 – Present	Member of a team creating a MS program in Cybersecurity for the College of Emergency Preparedness, Homeland Security, and Cybersecurity, in coordination with the Strategic plans of the University at Albany in the area.
March 2018 – Present	Member of a team creating a BS program in Cybersecurity for the College of Emergency Preparedness, Homeland Security, and Cybersecurity.
Summer 2018 – Fall 2018	External reviewer for the SUNY Cobleskill Bachelor of Technology (BT) degree proposal in Cybersecurity.
October 2014 – June 2015	Member of a team that planned a workshop on how to chair a department in computing and information. Presented during the ACM SIGCSE conference in March 2015 in Kansas City.
2012 –2015	Member of a team that stood up the University at Albany’s BS degree in Informatics. We planned, sought internal funding for, created the curriculum for, got University, SUNY, and NYS SED approval for, hired faculty for, and began offering the program.
2002 – Present	Grant Proposal Reviewer in Bioinformatics and related areas, National Institutes of Health.
Ongoing	Reviewer for various journals and conferences, including Proteins, Neural Computation, Connection Science, IEEE Expert (Special Track on Natural Language Processing). American Medical Informatics Association.

Teaching Experience

Spring 2025	Updated the course CYBR 102 <i>Technical Foundations of Cybersecurity</i> . This course is an outgrowth of my earlier CSI/INF/CYBR 124 course (cf. below). I adapted the course to use active learning pedagogies (e.g., flipped classroom, teams) and to include hands-on cloud-based cybersecurity labs. To accommodate the increasing growth in cybersecurity at UAlbany, this is designed for large courses – 100+ students.
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Fall 2024	Created a new course, TUNI 250 <i>Artificial Intelligence and Cybersecurity</i> . A course custom-designed for University at Albany Honors students. Using active learning and related engaging pedagogies, covered the foundations of modern cybersecurity and artificial intelligence, and current and emerging areas where they overlap.
Spring 2023	Created a new course, INF 135 <i>Concepts of Artificial Intelligence</i> . This is an introductory course in AI and machine learning that features both hands on learning as well as both the concepts underlying AI/ML, as well as the social aspects of the area (e.g., bias, just use).
Spring 2020	Adapted the INF 124X <i>Cybersecurity Basics</i> course for a large enrollment online teaching and learning course. The emphasis is to retain the student engagement that characterizes the current face-to-face offerings of INF 124X. Note that this effort pre-dated the COVID-19 pandemic, but the timing was fortunate.
Summer 2019, Summer 2018	Presentation and 2-hour workshop on 3D printed prosthetics to a Middle School Summer Enrichment program held at Tech Valley High School. Program designer and co-presenter.
Summer 2019	As part of the University at Albany STEP program, worked with a group of four high school students on an enhanced 3D printed prosthetics project. This project involved elements of design, problem solving, 3D printing, and related tasks.
Spring 2019	Created a new course, 455/555, <i>Prevention and Protection Strategies in Cybersecurity</i> . The course is a senior (and first year graduate student) elective, suitable for use in Cybersecurity concentrations in the INF or EHC BS programs, or the MSIS Cybersecurity concentration.
Spring 2019	Part of a team from Tech Valley Center of Gravity Makerspace, the University at Albany, Siena College, Emma Willard School, and Shaker High School that created, designed and offered a multi-week evening program for middle school students on design, technology, and maker technologies. The capstone project for the program was the design and creation of a forearm and hand prosthetic for an actual recipient.
Fall 2018	Created two new courses, INF 124X, <i>Cybersecurity Basics</i> , and INF 454/554, <i>Human Aspects of Cybersecurity</i> . The former is a general introduction to the topic, both for INF and EHC majors, as well as a 21 st Century Challenges General Education elective for all students. The latter is a senior (and first year graduate student) elective, suitable for use in Cybersecurity concentrations in the INF or EHC BS programs, or the MSIS Cybersecurity concentration.
Fall 2017	Revised the core Computer Science (CSI 213) and Computer Engineering (CEN 213) Course <i>Data Structures</i> . Created a novel course structure to meet the needs of students in both programs, as well as to produce course materials that are suitable for face-to-face, online, and hybrid versions.

Spring 2011	With Dr. Jennifer Goodall, created and taught CSI105 "Computing and Information." The course is a broad introduction to the fields of Computer Science, Information Science and Informatics. It was designed to use team-based, active learning methods to engage the students and promote learning.
Fall 2008	Created and taught the new Honors version of "Introduction to Computer Science" (TCSI201). The course uses a personal robot approach to learning how to program. It also incorporates image processing and graphics examples.
Fall 2007, Spring 2008	Revised the curriculum for CSI201 "Introduction to Computer Science" to use a media computation approach to the material that maintains rigor while increasing the relevance of the material to the students. Also updated to use the Java programming language. In the Spring offering added daily multiple use of clickers to further increase student participation and engagement.
Spring 2006	Created and taught a new undergraduate Information Literacy General Education Course, CIS124X "Computer Security Basics."
Spring 1998	Revised the curriculum of the advanced graduate class "Artificial Intelligence II" (CSI 635). The revised curriculum concentrates on various current theories in machine learning and their implementations. The emphasis of the course is on implementation and experimentation.
Fall 1995	Using money from the NSF and the University, created a laboratory for use in the first three CSI major courses (CSI 201N, CSI 310 and CSI 333). Completely rewrote the curriculum in CSI 201N to take advantage of this cutting edge facility, its modern languages, operating system, graphics, and World Wide Web (WWW) and other Internet connections.
Spring 1991	Created an advanced graduate level topics course on the theory and practice of artificial neural networks (CSI 620).
Fall 1991	Created a new, senior level elective course "Introduction to Artificial Intelligence" (CSI 435).

Academic Committee Work and Service

2024 - Present	Senator representing the College of Emergency Preparedness, Homeland Security, and Cybersecurity in the University at Albany Faculty Staff Senate. Member, Undergraduate Academic Council, and its associated Curriculum and Honors Committee.
2025	Chair, Second Year Review Committee for an assistant professor in the Cybersecurity Department.
2025	Member, Second Year Review Committee for an assistant professor in the Information Sciences and Technology Department.

2024 – Present	Cybersecurity Department Graduate Advisor. Handled course selection and degree progress for M.S. Students. Created an advisement form with which the student and advisor can easily gauge the student's progress towards the degree.
2024 - Present	Member, University at Albany Honors College Academic Standing Committee.
2022 - Present	Member, University at Albany Honors College Board.
2024 - 2025	Member, Promotion and Tenure Committee for an assistant professor in the Information Sciences and Technology Department.
2024	Member, Search Committee to hire two faculty members for the Cybersecurity Department of the College of Emergency Preparedness, Homeland Security, and Cybersecurity.
2024 - 2025	Member, Promotion and Tenure Committee for an assistant professor in the Information Sciences and Technology Department.
2024	Chair, Promotion and Tenure Committee for an assistant professor in the Cybersecurity Department.
2019 - present	Chair, Search Committee to hire a faculty member in Cybersecurity for the College of Emergency Preparedness, Homeland Security, and Cybersecurity.
2018 - 2019	Chair, Search Committee to hire a faculty member in Informatics for the College of Emergency Preparedness, Homeland Security, and Cybersecurity.
2017 - 2022	Member of University at Albany Graduate Academic Council. Chair (and University Senator) Fall 2019 – Spring 2022.
2017 - 2019	Member of University at Albany Curriculum Committee of the Graduate Academic Council. Chair, Fall 2018-2019.
2014 - 2015	Member, Search Committee to hire a faculty member in cyber security for the Informatics Department.
2014	Member, Search Committee to hire a Provost and Academic Vice President for the University at Albany.
2013 - 2017	Member of University at Albany Undergraduate Academic Council.
2013 - 2017	Member of University at Albany Curriculum and Honors Committee of the Undergraduate Academic Council.
2013 - 2014	Chair, Search Committee to hire three full time Instructors (“Evergreen”) for the Informatics Department.
22013 - 2014	Member and UAlbany representative, SUNY Computer Science Transfer Path Review Group. Discussed and proposed ways to integrate the educational experience for students in Computer Science who transfer within SUNY institutions (esp. Community colleges to four year/university center campuses).

2013 - 2014	Member, Search Committee to hire a total of four faculty in data analytics and cyber security for the Informatics and Computer Science Departments.
2013 - 2014	Member, Search Committee to hire a faculty member in Information, Government and Democratic Society for the Informatics Department.
2013 - 2014	Member, Search Committee to hire a faculty member in Government Information Strategy and Management for the Public Administration and Policy Department.
2013 - 2014	Member, Search Committee to hire a faculty member in Homeland Security for the Public Administration and Policy Department.
2013 - 2014	Member, Search Committee to hire a faculty member and Ph.D. program Director for the Informatics Department.
2012 – 2013	Member, Search Committee to hire staff Director for the Core facility in the RNA Institute at the University at Albany. (While on sabbatical)
2012 – 2013	Member, "Online Teaching and Learning" (OTL) Strategic Conversation - Insuring Technological Support” Committee. (While on sabbatical)
Spring 2012	Member, Strategic Plan Implementation Research Working Group.
Fall 2011, Spring 2012	Reviewer UAlbany Impact/SUNY 2020 Proposals.
Summer and Fall 2009	Member, University at Albany Graduate Student Support (GSS) Review Panel. Evaluated Ph.D. programs.
Spring 2011	Member, Budget Advisory Group IV, University at Albany.
Spring 2011	Member, Strategic Planning Graduate Education Task Force, University at Albany.
September 2006 – August 2009	Member, University at Albany Library and Information Systems Council (LISC)
September 2005 – August 2006	Chair, Department of Computer Science Computing Oversight Committee overseeing all aspects of administering the department's computer systems and networks.
September 2001 – June 2002	Chair, College of Arts and Sciences Academic Programs Committee. Approved course and program additions and changes from within the college. Organized <i>ad hoc</i> student grievance committees.
January 2001 – June 2001	Co-chair, College of Arts and Sciences Academic Programs Committee Approved course and program additions and changes from within the college. Organized <i>ad hoc</i> student grievance committees.
September 1999 – June 2002	Computer Science Department representative to the College of Arts and Sciences Council. The representative body for the faculty and departments within the college.

September 2001 – May 2002	Member, College of Arts and Sciences Dean Search Committee. Appointed to identify, interview and recommend candidates for the position of Dean of the college.
September 2001 – May 2002	Co-chair, Joint Computer Science Department/Center for Comparative Functional Genomics Faculty Search Committee Tasked with finding a faculty member for a new joint position in bioinformatics.
September 2000 – May 2001	Chair, Computer Science Department Faculty Search Committee.
September 2001 – August 2004	Chair, Department of Computer Science Computing Oversight Committee overseeing all aspects of administering the department's computer systems and networks.
September – August 2004	Member, Department of Computer Science Undergraduate Program Committee overseeing all aspects of the undergraduate program, especially monitoring curriculum and ensuring that it is up to date.
September 1997 – August 2000	Chair, Department of Computer Science Undergraduate Program Committee overseeing all aspects of the undergraduate program, especially monitoring curriculum and ensuring that it is up to date.
November 1997 – Spring 1998	Department of Biological Sciences Chair Search Committee – University at Albany. A committee drawn from several departments charged with externally recruiting a renowned researcher to serve as chair for the Dept. of Biological Sciences.
September 1993 – January 1995	Department of Linguistics and Cognitive Science, Curriculum Committee. Responsible for the department's major and minor programs.
October 1993 – December 1995	Goldwater Scholarship Committee. Nominates and prepares student applications for Goldwater Scholarship program.
Summer 1993	Summer Chair, Department of Computer Science. Handled routine administrative matters for the department.
September 1992 – August 1996	Associate Chair for Undergraduate Affairs, Department of Computer Science. Responsible for administration of the department's three undergraduate majors, and related matters.
September 1992 – June 1993	Faculty Search Committee, Department of Biological Sciences – University at Albany/Wadsworth Center – NYS Department of Health. Responsible for recruiting a computational biologist to hold a joint position in the two institutions.
October 1991 – June 1993	College of Science and Mathematics Scholarship Committee to promote, encourage and help undergraduate and graduate students to receive academically competitive scholarships and fellowships.

January 1990 – Present	Department of Computer Science Undergraduate Advisor. Handle course selection and degree progress for undergraduates in each of the department's three baccalaureate degree programs.
January 1990 – August 1992	Department of Computer Science Executive Committee, an advisory committee to the department chair, consisting of the heads of the department's three standing committees, the associate chair, and the chair.
January 1990 – August 1992	Chair, Department of Computer Science Undergraduate Program Committee coordinating all aspects of the program, especially advising, monitoring and revising the program's curriculum.
January 1990 – September 1991	Department of Computer Science Graduate Program Committee overseeing all aspects of the program, especially admissions, program administration and coordination of the analytic examinations. Liaison between the Undergraduate and Graduate Program Committees.
November 1989 – January 1990	Department of Computer Science PhD Program Committee overseeing all aspects of the program, especially admissions, program administration and coordination of the analytic examinations.
October 1989 – May 1991	Department of Linguistics and Cognitive Science Masters Program Committee, overseeing the establishment and administration of M.A. programs in Linguistics and Cognitive Science.
September 1989 – January 1990	Department of Computer Science Masters Program Committee which handles all aspects of the program, especially admissions, advising, and monitoring and revising the program's curriculum.
September 1989 – January 1991	Department of Computer Science Graduate Advisor. Handled course selection and degree progress for Masters and beginning Doctoral Students. Created the department's "MS Checklist", a form with which the student and advisor can easily gauge the student's progress towards the degree.
January 1989 – June 1993	College of Science and Mathematics Diversity Committee to promote ethnic, racial and gender diversity in the faculty, staff and students of the college.
September 1988 – August 1989	University Linguistics and Cognitive Science Committee to oversee the administration and curriculum of these programs. Dissolved upon formation of the Department of Linguistics and Cognitive Science.
September 1988 – August 1992	Faculty advisor to the Albany Student Chapter of the Association for Computing Machinery (ACM) and coach of their programming contest team.