Georges Grinstein
Research Professor - Computer Science Department
Data Visualization and Visual Analytics
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Research activities: visualization (data, information, knowledge, decision making. perception, cognition), visual analytics, virtual environments, user interfaces, computer human interaction, evaluation of visual analytics systems and tools. The emphasis is on the modeling, analysis, visualization and exploration of complex information systems including many in the biomedical and military arenas, with the goal of optimizing human understanding, learning, memory, impact, interpretation and decision-making. Most current research is goal directed cognition of static and interactive visualizations, and computer human integration.

Education

Ph.D.	Analytic Number Theory	University of Rochester
M.S.	Applied Mathematics	New York University
B.S.	Mathematics	City College of New York

University Positions
University of Massachusetts, Center for Data Science, Research Professor 2017-date
University of Massachusetts Lowell, Co-Director Center for Biomolecular and Medical Informatics, 2001-2016
University of Massachusetts Lowell, Co-Director Institute for Visualization and Perception Research, 1991-2016
University of Massachusetts Lowell, Professor Computer Science, since 1988-2016
University of Massachusetts Lowell, Associate Professor Computer Science, 1985-1988
Fitchburg State College, Assistant Professor Computer Science, 1981-1985
Auburn University at Montgomery, Assistant Professor Mathematics, 1977-1981
Temple University, Lawton Fellow in Number Theory, 1976-1977
Cambridge University, UK, Mathematics, 1974

Member
DHS Center of Excellence: - Command Control and Interoperability for Advanced Data Analysis (CCICADA)

Professional Activities
Standards
MIT X Windows Consortium, Open Software Foundation, US International Standards Organization, Chair ANSI X3H3.6, HL7

Societies
Vice Chair International Federation for Information Processing WG5.10, IEEE Computer Society, ACM SIGGRAPH, SIGKDD and SIGCHI, Eurographics, Society for Information Display, AAAI, AMIA, DIA.

Journals and Book Series
Past member of the Editorial Advisory Board of Computer Graphics Forum, of Computers and Graphics Journal, of the Editorial Advisory Board of the Journal of Data Mining and Knowledge Discovery. Co-editor of IFIP Series on Computer Graphics. Organizing committee for a number of Journal special issues (for example, most recent Special Issue of IEEE Computer Graphics and Applications on Visual Analytics Evaluation 2008 and 2013).

Positions in Conferences and Workshops
IEEE Visualization Conferences (1990-2017) various positions: co-chair, program co-chair, panels co-chair, contest/challenge co-chair, workshop organizer; VAST Challenge co-chair (2006-2017); Co-chair International Conference on Information Visualization (2007- 2017); Co-chair SPIE'95, 96 and 97 Visual Data Exploration and Analysis Conference; co-chair IFIP Conference on Psychological & Cognitive Issues in Data Visualization; co-chair IEEE 1993 and 1995 Workshops on Database Issues in Visualization; co-chair AAAI and IEEE 1997 Workshops on Integration of Data Mining and Visualization; program committee 1996-98, and 2002 International Conferences on Knowledge Discovery and Data Mining (KDD'96, 97, 98, and 2002), ACM Workshop on Visual Data Mining (2001), Co-chair Workshop in Visualization in Bioinformatics and Cheminformatics (2002). Workshops: ACM SIGGRAPH Workshops on Visualization Education, University of Washington/Microsoft Research First Summer Institute on Data Mining (1997), NATO Experts Workshop Visualization of Massive Military Data Sets (1996, 2003), NATO Workshop on Cyber Symbology (2016), National Breast Center Conference (2006, 2007). Program committee BELIV 2006-2014, CMV 2006-2008; Co-chair 2007-2015 Information Visualization in Biomedical Informatics Symposium; Co-chair 2008-2012 Visual Data Mining and Analytics Symposia; Co-chair BIBE07 Bioinformatics Conference; program committee, presenter and panelist at numerous other conferences.

Invited Talks and Lectures

Invited lectures and colloquia
At industry, university and government organizations including GTE, GE, DEC, DG, IBM, TMI, BBN, Amoco; Iowa State, University of New Hampshire, URI, MIT, Harvard, Brown, NYU, WPI, Franklin and Marshall, LSU, University of Arkansas; NASA, Roland Institute, Pfizer, Millennium Pharmaceuticals, Genetics Institute, Broad Institute, Census Bureau, CDC, NIH, DHS, NCI, NATO, AF, Navy.

Panelist and speaker
On Data Exploration and Visual Analytics at several IEEE, ACM and others conferences (SIGGRAPH, SIGCHI, KDD, AAAI).

Opening keynotes
At GI'89 (Germany), GIS'94 (Canada), KDD'96 (US), IV'08 (London), SPIE'12 (US), VizBI'12 (Heidelberg), IV'12 (Montpellier), IV'14 (Paris), EuroVA'15 (Sardinia), Bioinformatics 2016, VINCI 2016

Reviewer
For ESPRIT, NASA, NSF, NIH, NATO, and various IEEE and ACM journals and conferences.

Visualization and Data Mining Tutorials
Given over the last 25 years at most major conferences, including BioIT 2002-09, Drug Discovery Technology 2002-2005, 2015-2017, IEEE Visualization 1990-2014, ACM KDD 2002, IV2008-2014, IBC Bioinformatics 2002 Summit, as well as less academic such as CHI (2002-2007), IBC (2002-2004), DIA 2003, NCBC (2006-2007), USSTRATCOM 2016

Consortia
Co-Founder and Co-Director of the Open Indicators Consortium (OIC) through 2015
Past Member National Visual Analytics Consortium (NVAC)

Consulting Activities 1992 – 2016
Bristol-Meyers-Squib: How to Cognitively Improve Visualizations (2016)

US Air Force (WPAFB, ARL): Visualization Workshop, Institutional Review Board (2012-2015)

Charles River Analytics: High-Performance Visual Analytics for Real-Time Strategic Displays (2014-2015)

Boehringer-Ingelheim: Visualization and Communication (2013)

SAS/JMP: Data Visualization in the Life Sciences (2013)

Ford and Honda: Expert Witness (2012)

Global MedChoices: Advisory Board (2009)

State of Louisiana: Development of Northern Louisiana Bioinformatics Research Consortium (2004-2006)

SensAble Technologies, Inc.: Phantom Haptic Device Research (2003-2009)

AnVil, Inc. Founder and Director of Research (2000-2003)

Transform Pharmaceuticals, Inc. Scientific Advisory Board (2000-2002)

SynaPix, Inc. Vision System Architect   3D Scene Reconstruction (2000)

3D Open Motion, LLC. Founder and Director of Research, 3D Motion Specification API (1998-1999)

Spacetec IMC. 3D Motion Control API (1993-1998)

Accrue Software, Inc.: Member of the Technical Advisory Board (1996-1997)

Cognos Inc.: Visualization and Data Mining (1996-1997)

Vermont Microsystems Inc.: Expert Witness in VMI vs. AutoDesk lawsuit.

The MITRE Corporation - Virtual Reality Application Research and Information Architecture Research

Consulting Activities Prior 1992

Intel Corporation - i860 Software Development Management

Kendall Square Research Corporation - Integration of Supercomputing, Animation and Graphics Software

IBM Corporation - Tools Development

China Science and Technology Commission - Evaluate PRC Graphics and Imaging Research Labs.

Lexidata Corporation- Engineering R&D in Diagnostics and Development.

Montachusetts Opportunity Council - Computerization of State and Federal Agencies.

Alabama Reference Laboratories - Interactive Real-Time Laboratory Blood Analysis Software

United States Geological Survey   - Software development for Water Resources Division.

Commercial Course Development

Courses in Visual Analytics, Visualization, User Interfaces, X/Motif/Windows Software Development, UML, Computer Graphics, Computer Languages, Virtual Reality, Bioinformatics and Data Mining to IBM, DEC, OSF, NIST, and others.

Pro-bono Consulting support for Weave

International Institute of Lowell MA (2014-2016). The Institute's mission is to help refugees and immigrants become active participants in the social, political, and economic richness of American life.

On The Rise, Cambridge MA (2013-2014). On The Rise is a day program for homeless women. Its mission is to create a community where women have the relationships safety and resources they need to move out of homelessness.

Numerous other organizations since 2010.

Grants and Contracts with numerous co-PIs in various disciplines - 1986-2016

Center for Disease Control and ASTHO $400,000; Development of a National Community Public Health Platform (2014-2015)

State of Tennessee ($25,000); Weave support and customization (2015)

National Institutes of Health, $450,000; Visualizing Highway Pollution: A Study of Intergenerational Health Communication (with Tufts University and UMass Boston) (2014-2016)

Pacific Northwest National Labs, $25,000; VAST Challenge support and chairing (2014-2015)

Charles River Analytics: $180,000; Visualization of Real-time Streaming Situational Analysis Data (2014-2016)

Memphis, $30,000: Real-time analysis and visualization of health data (2014)

Center for Disease Control, $125,000; Research on Advanced Analytics (2013-2014)

Atlanta, $10,000: Public data analysis visualizations using Weave (2014)

Presidents S&T grant with UMass Dartmouth and 4 other Universities, $26,000 to UMass Lowell; Scientific Data High Performance Simulation Computations applied to Social Data (2013-2014)

Pacific Northwest National Labs, $20,000; VAST Challenge support and chairing (2013-2014)

Charles River Analytics: $80,000; Research on Visualization of Semantic Analysis Results (2013-2014)

Commonwealth of Massachusetts (Department of Veteran's Services), $25,000; Set up Weave to Visually Explore and Analyze Veterans Database (2013)

Providence Plan, $10,111; Advanced R Scripting in Weave (2013)

Community Teamworks Inc., $175,518; Client System Integration and Transaction Visualizations and Analyses

Center for Disease Control, $226,734; Research on Visualization of Survey Data (2012-2013).

Command Control and Interoperability Advanced Data Analysis Center: $25,000 per year base; Member of New Department of Homeland Security center focusing on advanced visual analytics. Rutgers is lead institution (2009-2014)

Open Indicators Consortium: well over $1,250,000. Continued support for research, development and deployment of Weave (see www.openindicators.org for details). This involves numerous additional subcontracts with cities, states, government organizations, non-profits and many more (some with co-PI William Mass) (2011-2014).

Massachusetts Department of Early Education and Care: $44,000; Support EEC on their Weave system and research ADA Compliance for visualizations (2012-2013)

The Boston Foundation, $10,000; Research on Web-page User Interfaces (2012-2013)

Longshortway Inc, $35,063; Research on classifiers and visualization (2012-2013)

Charles River Associates: $70,017; Research on networks and large data visualizations (2012-2013)

Houston Futures: $75,000; Open Indicators and Weave

Carleton College; $1500; Visualization of Hmong distribution

MAPC; $24,000; Weave Research and Extension for MAPC Sustainable Communities Regional Extend Weave capabilities to satisfy Sustainable Communities requirements (2012)

Wright Patterson Air Force Base: $100,000; Visualization Theory research to include predicting measurements for the perception, cognition and insight of data in visualizations (2011-2012)

Pacific Northwest National Laboratories: $56,000; Generation of synthetic data sets including one representing data from hospitals and public health centers handling a pandemic caused by a rapidly mutating virus. Goal is to discover the virulent mutations and their origin for the IEEE VAST 2010 Challenge (2010-2012)

Massachusetts Department of Early Education and Care: $75,000; Develop and evaluate educational assessment indicators using UMass Lowell's data visualization and analysis platform (2009-2012)

Knight Foundation: $120,000; Community-Based Data Visualization using Weave, a Web-based Analysis and Visualization Environment developed at UMass Lowell (2010)

NSF Eager $75,000; Metrics for Visual Analytics Evaluation (2009-2011)

Open Indicators Consortium: $1,000,000; Support for research and development of a web-based collaborative visualization systems for measures and indicators (members include Atlanta, Boston, Chicago, Columbus, Arizona, Connecticut, Rhode Island) (2009-2011)

MGH Avon Breast Center: $270,000 Patient Risk Model Analyses, HL7 interoperability, Natural Language Processing, Visualizations, Computer Human Interaction (2007-2012)

NSF: $25,000: Support for the VAST Evaluation Workshop at the 2009 IEEE Visualization Conference (2009)

NSF: $16,000: Undergraduate Student Visual Analytics Research Support (2009)

NSF: $5,000: Support for the VAST Evaluation Workshop at the 2008 IEEE Visualization Conference

NSF: $14,000: Undergraduate Student Visual Analytics Research Support

NIST: $20,000 VAST Contest Management and Automated Social Network Scoring Metrics

Pfizer: $75,000 per year for 2 years, High Dimensional Visualization Research for Drug Discovery

NSF (with UMd and PNNL): $408,689 Collaborative Research: Scientific Evaluation Methods for Visual Analytics Science and Technology (SEMVAST)

National Academy of Sciences (with William Mass): $11,000 NE Measures & Indicators Prototype

The Boston Foundation (with William Mass): $5,000 NE Measures & Indicators: Regional System Tools to Advance a National Model

NIST: $25,000 VAST Contest Management and Automated Scoring Metrics

NIST: $25,000 VAST Contest Management and Metrics Development

BBN/ARDA (GI2Viz): $38,000 Haptics and Sonification with Kinetic Displays

MGH Avon Breast Center: $25,000 Patient Database and Risk Model Analyses, Tablet Patient Data Entry

DERC (Diabetes and Endocrinology Research Center : $65,000 Microarray and Pathway Visualization

Evident Software Inc.: $140,000 Interactive Visualization of Large and Massive Transaction Data Sets

SensAble Technologies, Inc.: $49,000 Haptic Sound Software and API Development Research

BBN, Inc. $30,000 Research in Motion Parameters for Icon Visualizations

Anvil, Inc. $125,000 Research in Data Exploration for Bioinformatics Data Sets

Genetics Institute $154,000 Data Visualization Research

Millennium Pharmaceuticals $10,000 Data Mining and Visualization Experiments

EPA $300,000 to explore the impact of Science Modeling on High School Students (Judy Boccia PI, Center for Field Studies)

Pfizer $75,000 to explore Data Mining and Visualization applied to Drug Success Prediction

NIST $95,000 to explore standardization and evaluation strategies for data mining algorithms and systems

Spacetec $63,000 to explore APIs for highly interactive motion control

Pfizer National Grant $95,000 with Ken Marx - Data Mining and Visualization for DNA analysis

NIST $70,000 to explore visualization and data mining

ARPA $25,000 to explore interactive design issues for the MEDFAST Mobile Surgical Room (through MITRE)

ARPA $25,000 to explore interactive design issues for the Surgical Room of the Future Project (through MITRE)

NASA $66,000 to explore the integration of databases and visualization

Department of Health and Welfare (SBIR) $5,000 research integrating Exvis into BBN's Prophet

IDA - Supercomputer Research Center $100,000 explore visualization /supercomputing integration

DEC $60,000 to develop inter-language execution tools

XTechnology Corp. $12,000 to port the X windows system to a RISC platform

DEC $80,000 for support of Digital's next generation X Terminals

Kendall Square Research $98,000 to develop a new supercomputing visualization environment

Intel Corp. $75,000 to benchmark iGL for the Intel i860 chip and design the mapping of iGL to PEX

Litton/Itek Imaging $15,000 explore Exvis for the classification of military reconnaissance imagery

DEC $40,000 to support the automatic integration of C applications in other language environments

Amoco Research Production, Inc $75,000 for research in exploratory visualization environments

Mercury Computer, Inc. $10,000 to design an interactive distributed high performance visual API

Mercury Computer, Inc. $25,000 for research in exploratory visualization environments

DEC $75,000 for research in exploratory visualization environments

Veteran's Administration $25,000 develop the Mumps X Windows C language interface mechanism

Century Computing and NASA $26,340 extend NASA's Transportable Application Environment (TAE)

Veteran's Administration $50,000 to port X Windows/Motif to MUMPS and provide training support

Sanders/Lockheed $40,000 to evaluate parallel architectures and real-time operating systems

BGS $26,000 develop a statistical graphics library for the visualization of system performance data

Eaton Corporation $45,000 to develop dynamic and highly interactive widgets for manufacturing

Veteran's Administration $36,000 to port UMASS Lowell's GKS to the MUMPS environment

DEC $5,000 to explore RISC versions of Exvis

DEC and IBM $45,000 for support of the ANSI X3H3.6 X Window System document editor

Data General $30,000 to develop tools for high performance demos for the AViiON 88K workstations

Computer Based Systems, Inc. $4,889 for GKS support to JNGG

Intel Corp. $346,500 to develop a high-performance graphics library for the Intel i860

Open Software Foundation $211,000 for C++ Motif and to explore dynamic and migratable objects

UML $38,900 to create a Database for Graphics Standards

Alliant Computer Systems Corp. $ 6,750 for Quality Assurance for CA's Port of DISSPLA to the FX-8

Sanders/Lockheed $85,000 for evaluation of the Behavioral Model of a Graphics Processor

Williamson Petroleum Consultants, Inc $10,000 to port GKS to the IBM PS/2 Model 80 under OS/2

Sanders/Lockheed $ 73,000 to explore B-Spline Algorithms

Sanders/Lockheed $360,000 for Software Engineering of a Graphics Environment

Sanders/Lockheed $12,225 to develop Anti-aliasing algorithms for RGGB LCDs

Texet, Inc. $25,000 to develop a CGM Interpreter

Calcomp/Lockheed $136,700 for CGI language interfaces

NEC $12,000 for software and tools development

DEC $143,740 for research in the Visualization of Scientific Data

Visual Technology $16,000 to develop software test suites

Datacube $14,000 to develop a device-independent image processing environment

Sky Computer $5,000 for research on computational graphics engines

UML $48,200 to develop the ANSI Graphical Kernel System

Equipment and Software Donations

SUN Microsystems $7,500 –Server system and software

SensAble Technologies $7.500 – Five Omni Haptics Systems

ATI (AMD) $2,500 – Five ATI state of the art Graphics Card for the new Computer Gaming Course

Synergix Ltd. $3,000 - Lab license for Molecular Conceptor Cheminformatics Training Software (2004)

BioMed. $5,000 - Lab license for document management system (2004)

Tom Sawyer Software. $200,000 - Lab license for graph analysis environment (2003)

Clementine, Inc. $200,000 - Lab License for data analysis environment (2002)

SpotFire, Inc. $100,000 - complete visualization environment (1999)

AVS, Inc. $100,000 - complete Open Viz Visualization software (1999)

Thinking Machines Incorporated $100,000 - complete Darwin Data Mining Software Suite (1998)

Silicon Graphics $100,000 - complete SGI system and MineSet Data Mining and Visualization Software Suite (1997)

AVS, Inc. $100,000 - complete AVS Visualization software with campus support (1995)

DEC $100,000 - a variety of equipment / support from Digital Equipment Corporation

Spacetec. $5,000 - 3 Spaceballs and software

Verdix $20,000 - complete ADA compiler environment for DEC systems

VI $34,000 - complete Dataviews software exploration environments

Datatree $20,000 - MUMPS software development environments

Pixar Computer $10,000 - multiple copies of RenderMan

Sun Microsystems $149,000 - RISC Server with 1 Gigabyte disk storage

Apple $38,000 - 4 complete systems, 2 with extra displays

Intel $75,000 - fully configured Intel i860-based workstations

CIS $5,000 - 2 geometry/space balls for 3D interface explorations

DEC $200,000 - 4 DECStations with central server for work on the experimental visualization of data

Intel $50,000 - 2 fully configured Intel i860-based workstations

Data General $15,000 - 2 high resolution 88K-based AViiON workstations

Calcomp/Lockheed $870,000 - 18 Unix based high-resolution workstations for research in graphics

Univision $8,000 - 1 high resolution board for research and development in CG standards

Pixelworks $9,050 - 2 graphics board subsystems for R&D

Microsoft $1,200 - 4 Windows packages for investigating graphical and image processing applications

DEC $110,000 - 3 workstations and supporting software for research in visualization

Lexidata $75,000 - 3 Lex 90 systems with peripherals for development of a Virtual Device Interface

Academic and Professional Publications
Books and Edited Proceedings (Published)

Ward M., G. Grinstein and D. Keim (2015). Interactive Data Visualization, A.K. Peters Publishers, USA, second edition

Banissi E., …, G. Grinstein, et al (2007-2016), Editors, Proceedings of the 11th, 12th, …., 18th International Conference on Information Visualization, July, London (2007-2008), Barcelona (2009), London (2010-2012), Montpellier (2013), Paris (2014), Barcelona (2015), Lisbon (2016), IEEE Computer Society

Fayyad U., G. Grinstein and A. Wierse (2001), Editors. Information Visualization in Data Mining and Knowledge Discovery, Morgan-Kaufmann Publishers.

Grinstein, G. and R. Erbacher. (1997). Editors. Proceedings of the Third Visual Data Exploration and Analysis Conference, SPIE'97, The International Society for Optical Engineering Publishers.

Grinstein, G., A. Wierse and U. Lang. (1996). Editors. Proceedings of the Second IEEE Workshop on Issues on the Integration of Databases and Visualization, Lecture Notes in Computer Science, Vol. 1183, Springer-Verlag Publishers.

Grinstein, G. and R. Erbacher. (1995). Editors. Proceedings of the Second Visual Data Exploration and Analysis Conference, Volume 2410, SPIE, The International Society for Optical Engineering Publishers.

Grinstein, G. and H. Levkowitz. (1995). Editors. Perceptual Issues in Visualization, Springer-Verlag Publishers.

Lee, J. P. and G. Grinstein. (1994). Editors. Proceedings of the IEEE Workshop on Issues on the Integration of Databases and Visualization, Lecture Notes in Computer Science, Vol. 871, Springer-Verlag Publishers.

Grinstein, G., P. T. Breen and K. Seetharaman. (1993), A tutorial: Interactive Data Visualization and Virtual Environments, International Conference on Computer Graphics, Bombay, India.

Grinstein, G. and J. Encarnacao. (1990). Editors. Workstations for Experiments. IFIP Computer Graphics Series, Volume 1, Springer-Verlag Publishers.

Grinstein, G. (1987). A Short Course in C (with video series)
Grinstein, G. (1987). A Short Course in Modula 2 (with video series)
Grinstein, G. (1987). A Short Course in Scientific Basic (with video series)
All three above with the University of Massachusetts Office of Extended Engineering Press, Amherst, MA.

Book Chapters

Adam Russell, K. Daniels and G. Grinstein, Voronoi Diagram-Based Dimensional Anchor Placement for Radial Visualizations, invited chapter in post IV2012 Conference Journal.

Kevin S. Hughes, M. El-Tamer, S. Hughes, B. Drohan, J. Sharko, C. Lawrence, A. Loberg, and G. Grinstein (2010). The Potential of the Electronic Health Record in the Breast Center, in Breast Surgery, Eds. Dr. Dirbas and Dr. Scott-Conners, Springer US.

Damon Berry and G. Grinstein (2009), Iconic Displays, in the Encyclopedia of Database Systems, Eds. Liu Ling and Özsu Tamer, Springer-Verlag Publishers.

Georges Grinstein, B. Jessee, P. Hoffman, A. Gee, and P. Oneil (2001), High Dimensional Visualization Support for Data Mining Gene Expression Data, in DNA Arrays: Technologies and Experimental Strategies, CRC Press LLC, Florida.

Georges Grinstein and M. Ward (2002), Introduction to Data Visualization, invited chapter in Information Visualization in Data Mining and Knowledge Discovery, Usama Fayyad, Georges Grinstein and Andreas Wierse Eds, Morgan-Kaufmann Publishers

Georges Grinstein and M. Trutschl (1998). Input Devices, Chapter in The Encyclopedia of Electrical and Electronics Engineering", John Webster, Ed., John Wiley & Sons Publishers, New York.

Stuart Smith, R. D. Bergeron, and G. Grinstein (1992). Stereophonic and surface sound generation for exploratory data analysis, in M. Blattner and R. Dannenberg, Eds. Multimedia and Multimodal Interface Design. New York: ACM Press.

Computer Science Publications (Journals, Proceedings and Articles)

Chen, M., Grinstein G., Johnson C., Kennedy J., Munzner T., and M. Tory, Pathways for Theoretical Advances in Visualization, to appear in IEEE Computer Graphics and Applications, 2017.

Wong C., Cleary E., Patton A., Wu H., Xie A., Grinstein G., Koch-Weser B. and D. Brigge, Visualizing Air Pollution: A New Approach to Environmental Health Education, Asian & Pacific Islander Caucus for Public Health, APHA 2017 Atlanta November 2017

Crouser J.R., Cook K., Fallon J., Grinstein G., Liggett K., Nebesh D., Staheli D., Whiting M.A., and K. Whitley, VAST Challenge 2016: Streaming Visual Analytics, IEEE Symposium on Visual Analytics Science and Technology (VAST) 2016, October 2016, Baltimore, MD

Galkina, E., Wong C., Brugge D., Patton A., Koch-Weser S., Dufilie A., Wu H.-C., Stubblefield J., Mass W. and G. Grinstein Making Air Pollution Visible: Development of an Interactive Map of Near Highway Ultrafine Particle Concentrations, The 28th annual International Society for Environmental Epidemiology Conference, Rome, Italy, 1-4 September, 2016

Marceau, R., K. Daniels, G. Grinstein, A Visualization Framework to Eliminate Cluster Overlap, the 13th International Conference on Modeling, Simulation and Visualization Methods, Las Vegas, July 2016.

M. Whiting, Cook K., Grinstein G., Fallon J.,, Liggett K., Staheli D. and J. Crouser, VAST Challenge 2015: Mayhem at Dinofun World, IEEE Symposium on Visual Analytics Science and Technology (VAST) 2015, October 2015, Chicago IL

Patterson, D., T. Hicks, A. Dufilie, G. Grinstein, W. Plante, Dynamic Data Visualization with Weave and Brain Choropleths, PLOS ONE, DOI: 10.1371/Journal.pone/0139453, September 2015

Perkins, M., Chen Y., and G, Grinstein, The Use of High-Dimensional Visualizations in Explaining Hospital Pricing Patterns, EuroVA, The sixth International EuroVis Workshop on Visual Analytics, Sardinia, May 2015

Kamayou, F., H. Granz, M. Tuccar, S. Purushe, G. Grinstein, M. Paciello, G. Coleman, "Implementing Accessibility in a Widely Distributed Web-based Visualization and Analysis Platform – Weave, Journal on Technology and Persons with Disabilities, Annual International Technology and Persons with Disability Conference, pp257-277, San Diego, March 2015.

Anbalagan, S.K.; Grinstein, G.; Purushe, S., "Personal informatics: weave your numbers," 2nd International Conference on Contemporary Computing and Informatics (IC3I), Greater Noida, India, Nov. 2014

Whiting M., K. Cook, G. Grinstein, K. Liggett, M. Cooper, J. Fallon, M. Morin, VAST Challenge 2014: The Kronos incident, IEEE Symposium on Visual Analytics Science and Technology (VAST) 2014, Paris France

Tarrell A., C. Forsell, A. Fruhling, G. Grinstein, R. Borgo and J. Jean Scholtz, Toward Visualization-Specific Heuristic Evaluation, Proceedings of the Workshop on Beyond Time And Errors: Novel Evaluation Methods For Visualization (BELIV 2014), Paris, November 2014

Russell A., R. Marceau, F. Kamayou, K. Daniels and G. Grinstein, Clustered Data Separation via Barycentric Radial Visualization, The 2014 International Conference on Modeling, Simulation and Visualization Methods, Las Vegas, July 2014.

Galkina E. and G. Grinstein, Regional Differences in Diagnostic Conversion to Dementia, Proceedings of IEEE 18th International Conference on Information Visualization, July 2014, Paris.

Russell, A, F. Kamayou, R. Marceau, K. Daniels and G. Grinstein, Point Sensitivity for Radial Visualization under Dimensional Anchor Motion, Proceedings of the 22nd International Conference on Computer Graphics, Visualization and Computer Vision, Pilesn, Czech Republic, June 2-5, 2014.

Dufilie, A. and G. Grinstein: Feathered Tiles with Uniform Payload Size for Progressive Transmission of Vector Data. 2014 Web and Wireless GIS (W2GIS), 19-35, Seoul, South Korea.

Patterson R.E., L. Blaha, G. Grinstein, K. Liggett, D.E. Kaveney, K. Sheldon, P. R. Havig, and J.A. Moore, A Human Cognition Framework for Information Visualization, in Computer and Graphics, 42: 42-58, April 2014.

Kolman S., E. Galkina, A. S. Dufilie, Y-F Luo, V. Gupta, and G. Grinstein, Linked visual analysis of structured datasets and document collections, Proceedings of the 2014 SPIE Visualization and Data Analysis Conference, Vol 9017, Feb 3-5 2014, San Francisco.

Crawford Gotway C., M. Smyser, G. Grinstein, J. Ribble, S. Park, R. Chapman, S. Purushe, P. Ryan, F. Kamayou, E. Galkina, Visualizing Health: Enhancing Public Health through Weave Data Analysis and Visualization, IEEE Visualization 2013 Conference Special Workshop, Public Health's Wicked Problems: Can InfoVis Save Lives? Online in Proceedings of IEEE Vis Conference Workshop, Atlanta, October 2013.
http://www.cc.gatech.edu/gvu/ii/PublicHealthVis/Papers/Enhancing%20PH%20through%20Weave%20Data%20Analysis%20and%20Visualization_Draft.pdf

Whiting M., K. Cook, C. Paul, K. Whitley, G. Grinstein, B. Nebesh, K. Liggett, M. Cooper, J. Fallon, VAST Challenge 2013: Situation Awareness and Prospective Analysis, In the Proceedings of the IEEE Visualization Conference, Atlanta, October 2013.

Granz H., M. Tuccar, S. Purushe and G. Grinstein, Implementing Disability Accommodations in a Distributed Web-based Visualization and Analysis Platform – Weave, Proceedings of the Human Computer Interaction International Conference (HCI), Design Methods, Tools, and Interaction Techniques for Inclusion, pp. 31-39. Springer Berlin Heidelberg, 2013.

Scholtz J., M. A. Whiting, C. Plaisant and G. Grinstein. Evaluation of Visual Analytics environments: The road to the visual analytics science and technology challenge evaluation methodology. Information Visualization. July 2013.

Cook K., G. Grinstein and M. Whiting, The VAST Challenge: History, Scope, and Outcomes, Special Issue on Visual Analytics, Journal of Information Visualization, July 2013.

Daniels K., G. Grinstein, A. Russell and M. Glidden, Properties of Normalized Radial Visualizations. Journal of Information Visualization, October 2012 Vol. 11 No. 4, pp 273-300

Scholtz J, Whiting A. M., Plaisant C. and G. Grinstein, A Reflection on Seven Years of the VAST Challenge, Proceedings of the BELIV Workshop, Beyond Time and Errors: Novel Evaluations Methods for Visualizations , ACM 2012.

Galkina, E. and G. Grinstein, Challenges of Exploratory Visualization of Gene-Environment Interaction in Alzheimer's Disease. Proceedings of the 16th International Conference on Information Visualization, MediViz Symposium, pp 567-572, July 2012

Russell A., Daniels K. and G. Grinstein, Voronoi Diagram Based Dimensional Anchor Assessment for Radial Visualizations. Proceedings of the 16th International Conference on Information Visualization, Biomedical Symposium, Montpellier, July 2012

Giddings, J., Mass W., Dufilie A. and G. Grinstein, Weaving the U.S. Census: Visualization and Cross-Jurisdictional Exploration and Comparisons. Proceedings of the 16th International Conference on Information Visualization, Visualization Theory and Practice Symposium, pp 619-624, July 2012.

Kolman S. and Grinstein, InfoMaps: A Session Based Document Visualization and Analysis Tool. Proceedings of the 16th International Conference on Information Visualization, Visualization Theory and Practice, pp 274-282, July 2012.

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Pickett, R. M. and G. Grinstein. (1988). Iconographic Displays for Visualizing Multidimensional Data. IEEE Conference on Systems, Man, and Cybernetics. Proceedings, pp 514-519.

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Video Tapes

Grinstein, G. (1997). The State of the Art in Visualization. MITRE Lecture Seminar Series, 20 January 1997.

Grinstein, G. (1994). The Future of Interactive Visual Communication. The MITRE Institute Invited Lecture Seminar Series, 26 April 1994.

Grinstein, G. (1987). A Short Course in C. Video Course Series (6 tapes). University of Massachusetts Office of Extended Engineering Press, Amherst, MA.

Grinstein, G. (1987). A Short Course in Modula 2. Video Course Series (6 tapes). University of Massachusetts Office of Extended Engineering Press, Amherst, MA.

Grinstein, G. (1987). A Short Course in Scientific Basic. Video Course Series (6 tapes). University of Massachusetts Office of Extended Engineering Press, Amherst, MA.

Past Commercial and Publicly Available Products Developed

Weave, Web-Based Analysis and Visualization Environment, publicly released, open source, large scale us by cities, states, government organizations, companies and many others.
Graphical Kernel System - In use over 50 sites in the world.
Computer Graphics Metafile - In use in national labs and in commercial products.
Plot Library - In a few commercial products.
Exploratory Visualization Environment - License available product.

C++ Motif Binding - Publicly available. In many sites. Distributed by OSF as well.
Intel Graphics Library (iGL-860) - In many sites.
MIVAC – Licensed to AnVil, Inc.
X and Motif Course - Used commercially by several groups.
Computer Graphics and Visualization Courses **-** Used commercially by many companies

Current Commercial and Publicly Available Products Developed

Weave - Open source collaborative interactive visualization software; basis for The Open Indicators Consortium
Health Level 7 Translators – freely available
Several Visualization, Analysis, Haptics and Sonification Patents – licensable from the University

Community Service

Televideo graphics, visualization, and virtual reality courses to High School students. Pro-bono technical consulting and support to numerous non-profit organizations.

Instruction Related Activity
Undergraduate Teaching Experience

Calculus	Ordinary Differential Equations	Number Theory
Partial Differential Equations	Complex Variables	Numerical Methods in Computers
Modern Geometry	Linear Algebra	Foundations and Logic
Real Analysis	Topology	Engineering Mathematics
Discrete Structures	Probability and Statistics	Algorithms
Modeling and Simulation	Numerical Methods in Computers	Operating Systems
Computer Graphics (I and II)	The Internet and the Web	Introduction to Programming
Computer Gaming	Software Engineering 2	

Graduate Teaching Experience

Analytic Number Theory	Modern Geometry	Modern Algebra
Complex Variables	Computer Graphics (I and II)	Algorithms
Scientific Data Visualization (I and II)	Operating Systems	Image Processing
Data Structures and Algorithms	Visual Languages	Data Mining
Computational Geometry	Solids Modeling	Structural Morphology
Computer Animation	High-performance Graphics Systems	Virtual Reality
Computer Game Development	Chemoinformatics	Computer Gaming
Radical Design	Visual Analytics	Graph Layout Algorithms
Visual Analytics of Massive Graphs	Computational Methods in Molecular Biology	

Masters Students Theses (4)

Elaine Lupien (Masters)   May 1989
Cost Analysis for computer graphics software systems.

Karen Daniels (Masters)   May 1990
Spline curve drawing algorithms

Rudiger Strack (Masters Technical Uni. Darmstadt, co-advisor Dr. Encarnaçao)   June 1990
Data acquisition for, structuring of, and data retrieval from a computer graphics requirements database

Adem Albayrak (Masters)   May 2012
Report Generation for Weave with an Application in Genomics

Doctoral Students (28 finished; 4 in progress)

About ½ the students are at Universities or Research Centers (LSU, Utah State, UMass, Mass General Hospital, Dana Farber, Catholic University Chile, INRIA) and the others are in industry (Novartis, Pfizer, MITRE, Oracle, Draper, United Devices, Yahoo, Google, IBM and startups)
Also on thesis committees for students in many other Universities.

Hugh Masterman (Doctorate)   May 1992
Modeling and exploiting k-sequential data reference behavior in graphics and image processing algorithms.

Weidong Wang (Doctorate)   May 1992
On the automatic reconstruction of a 3D object's constructive solid geometry representation
from its 2D projection line drawing.

Krishnan Seetharaman (Doctorate)   July 1994
Interaction models for multi-sensory data visualization

David Southard (Doctorate)   June 1995
Vector quantization and nearest neighbor clustering with application to image compression and data visualization.

John Peter Lee (Doctorate)   May 1998
A systems and process model for database exploration.

Robert Erbacher (Doctorate)   May 1998
Visual Assistance for Concurrent Processing

David Pinkney (Doctorate)   Dec 1999
A framework for iconographics: a formal model of icons, interactions and interpolations

Patrick Hoffman (Doctorate)   Dec 1999
Table Visualizations: A Formal Model and its Applications

Claudio Meneses (Doctorate)   May 2002
Visual and Analytic Data Mining of Massive Data Sets

Marjan Trutschl (Doctorate)   May 2002
SOMn – Constrained Self-Organizing Maps for Data Exploration and Feature Extraction

Urska Cvek (Doctorate)   May 2004
Visual and Analytic Tools for Record Level Cluster Analysis

Ivan Galkin (Doctorate)   May 2004
A Pre-Attentive Vision Model for Automated Data Exploration Applied to Space Plasma Remote Sensing Data

Alex Gee (Doctorate)   Aug 2004
A Universal Visualization Platform

Howie Goodell (Doctorate)   May 2006
An Architecture to Support the Co-Exploration of Data and History

Chih-Hung Chiang (Doctorate)   Dec 2006
Probability Models for user session analysis in a visualization system: using previous sessions advantageously

Jianping Zhou (Doctorate)   May 2007
Visual Analytics for Partition Comparison and Evaluation

Hongli Li (Doctorate)   July 2009
A Unique Canonical Matrix Representation for Graphs and Networks

Shaun Morrissey (Doctorate)   Dec 2009
Real-time Visual Representation of Firewall/Security Rules Sets

John Sharko (Doctorate)   Dec 2009
Vectorized RadViz Theory and Applications to Newt & Mouse Microarrays

Brian Drohan (Doctorate)   May 2010
Visual Analytics for Breast Cancer Risk Assessment

Fanhai Yang (Doctorate)   May 2010
A New Architecture for Collaborative Session History and Interactions

Sean Konecni (Doctorate)   May 2011
Scenario Design for Evaluation of Visual Analytics Tools to Support Biomedical Research

Alex Baumann (Doctorate)   June 2011
The Design and Implementation of Weave: A Session State-Driven, Web-based Visualization Framework

Mary Beth Smrtic (Doctorate)   May 2012
Providing a Path to Understanding Complex Data and Visualizations

Sebastin Kolman (Doctorate)   May 2014
InfoMaps: Integrated Data and Document Visualization and Analysis

Shweta Purushe (Doctorate)   May 2016
Intelligent Big Data Visualizations and Bioinformatics
Tight coupling of web based analysis and visualization for large datasets

Ekaterina Galkina (Doctorate)   May 2016
Discovery of Complex Geomedical Patterns using Visual Analytics

Sanjay Anbalagan (Doctorate)   May 2016
Visualization Framework for Personal Digital Health Monitoring & Informatics

Senior Doctoral Students

Andy Dufilie – Session State and History, and Web-based Visualization Systems   Dec 2017
Miriam Perkins – Visualizing Topological Spaces of Gene Expression Dynamics   Dec 2017
John Fallon – Heterogeneous Data Visualizations and Analysis (Text, Imagery and Video) May 2018
Zach Maybury – Pattern Recognition on Massive Web-based Image Collections   May 2019

Also on the PhD committee of numerous doctoral students at UMass Lowell and world wide