

Dr. Ophir Frieder

Permanent Address:
5600 Wisconsin Ave, Apt. 18D
Chevy Chase, MD 20815

Business Address:
Dept. of Computer Science
Georgetown University
Washington, DC 20057
(202) 687-2165
ophir@ir.cs.georgetown.edu

Areas of Interest (Research and Teaching)

Scalable information processing systems from information retrieval to communications technology

Education

University of Michigan, Ann Arbor, Michigan (1981 - 1987)

Doctor of Philosophy in Computer Science and Engineering, 1987.

Master of Science in Computer Science and Engineering, 1985.

Bachelor of Science in Computer and Communication Sciences, 1984. **(Graduated Summa Cum Laude)**

Employment:

September 2017 – present

Research Associate

Institute of Information Science and Technology

Italian National Research Council (ISTI-CNR), Pisa, Italy

June 2015 – present

Chief Scientific Officer

Invariant, Inc. (formerly UMBRA Global, LLC), Roswell, Georgia

January 2010 – present

Professor

Department of Biostatistics, Bioinformatics, & Biomathematics
Georgetown University Medical Center

(July 2012 – present)

Robert L. McDevitt, K.S.G., K.C.H.S. and Catherine H. McDevitt, L.C.H.S. Professor in

Computer Science and Information Processing

(August 2010 – present)

Professor & Chair

Department of Computer Science
Georgetown University, Washington, District of Columbia

(January 2010 – August 2014)

September 1998 – December 2009 (on leave: August 2007 – July 2008)

ITRI Professor of Computer Science &

Director of the Information Retrieval Laboratory

Department of Computer Science

Illinois Institute of Technology, Chicago, Illinois

August 2007 – July 2008

Royden B. Davis, S. J., Chair in Interdisciplinary Studies

Georgetown University, Washington, District of Columbia

September 1996 – August 1998

Harris Professor of Computer Science and Computer Engineering

Division of Electrical and Computer Science and Engineering

Florida Institute of Technology, Melbourne, Florida

June 1996 – August 1996

**Visiting Professor at Institute for Artificial Intelligence
University of Bremen, Bremen, Germany**

September 1990 – August 1998 (on leave: September 1996 – August 1998)

Professor, (September 1995 – August 1998)
Associate Department Chair, (September 1994 – August 1995)
Associate Professor, (September 1992 – August 1995)
Assistant Professor, (September 1990 – August 1992)
Department of Computer Science,
George Mason University, Fairfax, Virginia

June 1987 – September 1990

Member of Technical Staff
Applied Research Area,
Bell Communications Research, Morristown, New Jersey

Consulting:

Staff Positions:

January 2001 – August 2008

August 1996 – February 1999

**Consultant to the Information/Government Systems Division
Harris Corporation, Melbourne, Florida**

May 1999 – December 2000

Consultant
IIT Research Institute, Chicago, Illinois / Bethesda, Maryland

August 1995 – September 1997

Consultant
Software Productivity Consortium (SPC), Herndon, Virginia

September 1994 – August 1996

Consultant
Science Applications International Corporation (SAIC), Arlington, Virginia

November 1993 – June 1994

Consultant
IBM Federal Systems Company, (Loral Federal Systems - as of March 1994), Manassas, Virginia

June 1992 – August 1993

**Consultant to the Computer and Software Engineering Division,
Institute for Defense Analysis, Alexandria, Virginia**

August 1991 – July 1993

**Consultant to the Technical Services Division at Headquarters,
Federal Bureau of Investigation, Washington, DC**

Selected Short Term Consultancy Contracts:

Computer Sciences Corporation (CSC), Landham, Maryland
IBM German Software Development Laboratory, Germany
Computer Data Systems, Inc. (CDSI), Rockville, Maryland
Information Systems & Networks Corporation, Bethesda, Maryland
CALIBRE Systems, Inc., Falls Church, Virginia
The Library Corporation, Inwood, West Virginia

Selected Legal Consulting:

Technical expert or expert witness on several intellectual property and contract disputes. Disputed topics include multiple Internet commerce and software technology issues.

- Case: MercExchange vs. GoTo.com
Role: Plaintiff expert witness
Firm: Hunton & Williams
- Case: MercExchange vs. Ebay.com
Role: Plaintiff expert witness
Firm: Hunton & Williams
- Case: Hewlett-Packard vs. Intergraph (third party lawsuit vs. Microsoft)
Role: Defense technical expert for Microsoft
Firm: Venable
- Case: e-Plus.com vs. Ariba.com
Role: Plaintiff expert witness
Firm: Hunton & Williams
- Case: IBM vs. Amazon
Role: Plaintiff technical expert
Firm: Jones Day
- Case: Civix vs. Yellowpages.com, Travelocity.com, Orbitz.com,
National Association of Realtors, Yahoo!.com, & Hotels.com
Role: Plaintiff expert witness
Firm: Niro, Scavone, Haller & Niro / Niro, Haller & Niro
- Case: Nokia vs. Qualcomm
Role: Plaintiff technical expert
Firm: Alston & Bird
- Case: Mapquest vs. Civix (**breach of contract – not IP dispute**)
Role: Defense expert witness
Firm: Niro, Haller & Niro
- Case: I/P Engine vs. Google
Role: Plaintiff expert witness
Firm: Dickstein & Shapiro
- Case: Rockstar vs. Google
Role: Plaintiff technical expert
Firm: Susman Godfrey

Board of Advisors (Selected)

June 2016 – present

QNTFY, Inc.

Arlington, Virginia

May 2013 – present

Pushd, Inc.

New York, New York

September 2006 – July 2008 (merged with Twitter)

SUMMIZE

Oakton, Virginia

November 2006 – October 2007 (acquired by Collexis Holdings)

SynnX Solutions GmbH

Cologne, Germany

October 2000 – December 2001 (acquired by Javien Digital Payment Solutions)

MicroCreditCard

Arlington, Virginia

Honors

Member, Academy of Europe (Academia Europaea), 2018

Member, European Academy of Sciences and Arts (EASA), 2018

National Academy of Inventors Fellow, 2014

IEEE Technical Achievement Award, "...pioneering development of scalable information systems", 2008

ASIST Research Award, 2007

ACM Fellow, "... contributions to search systems for distributed data", 2005

AAAS Fellow, "...scalable information systems, from communications technology to information processing", 2004

IEEE Fellow, "... the design and development of scalable multi-data type information systems", 2002

NSF National Young Investigator, 1993

Best Paper Awards

Best Paper Award, ACM/ICST 3rd Int'l Conf. on Scalable Information Systems (INFOSCALE), 2008

Best Paper Award, 35th Hawaiian Int'l Conf. on Systems Science (HICSS): Software Track, 2002

Best Paper Award, IEEE 4th Int'l Conf. on Computer & Communications Networks (IC3N), 1995

Local Recognitions

Georgetown University Office of Technology & Commercialization – Crystal Award, 2017

Harris Corporation Corporate Academic Recognition Award, 2009

Springer Science and Business Media – "Top Selling Title" award, 2007

Illinois Institute of Technology – College of Science & Letters Dean's Research Excellence Award, 2005

Florida Institute of Technology – University Wide Research Excellence Award, 1998

Florida Institute of Technology – College of Engineering Research Excellence Award, 1998

Harris Information Systems Division – Contributions Recognition Award, 1997

University Committees Served

Georgetown University (2010 - present)

Member, IT Executive Steering Committee (2012 – 2015)
Member, Steering Committee of GUMC Center for Biomedical Informatics [CBMI] (2011)
Member, Department Evaluation Committee (CFAR) (2010)
Member, Working Group for the Middle States Process (2010)

Illinois Institute of Technology (1998 - 2009)

Chair, University Distinguished Professorship Selection Committee (09/10)
Chair, Computer Science Department Tenure & Promotions Committee (08/09)
Chair, Computer Science Department Awards Committee (01/02, 02/03, 03/04, 04/05, 05/06, 06/07)
Chair, Computer Science Department Recruiting Committee (98/99, 99/00, 00/01, 01/02, 02/03, 03/04)
Member, University Wide Promotions Review Committee (02/03, 03/04, 04/05)
Chair, Chairman Review Committee (03/04)
Member, College of Science and Letters Dean Search Committee (02/03)
Member, University Wide Research Council (99/00, 00/01, 01/02)
Member, Armour College Promotions Review Committee (98/99, 99/00, 00/01, 01/02)
Member, Bioengineering Director Search Committee (99/00)
Member, Computer Science Chair Search Committee (98/99, 99/00)
Member, Armour Dean Search Committee (98/99)

Florida Institute of Technology (1996 - 1998)

Member, University Wide Promotions Review Committee (97/98)
Member, School of Engineering Promotions Review Committee (96/97, 97/98)
Member, Computer Science Department Recruiting Committee (97/98)
Member, Computer Science Department Graduate Committee (96/97)

George Mason University (1990 - 1996)

Chair, Computer Science Department Recruiting Committee (95/96)
Ph.D. Coordinator, School of Information Technology and Engineering (93/94)
School Representative, University Wide High Achievement Committee (93/94)
Member, Computer Science Department Recruiting Committee (91/92, 93/94)
Member, Computer Science Department Graduate Committee (92/93)
Chair, Computer Science Department Graduate Committee (91/92)
Member, School of Information Technology and Engineering Graduate Committee (91/92)
Member, Computer Science Department Undergraduate Committee (90/91)

Professional Activities

Member, National Academy of Science Panel – “Using Multiple Data Sources and State-of-the-Art Estimation Methods in Federal Statistics: Frameworks, Methods, and Assessment”, 2015 – 2017
IEEE Computer Society Fellows Selection Committee Member, 2015 – 2016
ACM Distinguished Lecturer Program, 2002 - 2004
IEEE Distinguished Visitor Program, 2000 - 2002

Editorial Involvement

Editorial Board Member, *Journal of Supercomputing*, 1999 – 2013
Editorial Board Member, *J. of the American Society for Information Science (& Technology)*, 1997–2008
Editorial Board Member, *Information Retrieval*, 1999–2004
Editorial Board Member, *Optical Networks Magazine*, 2001–2003
Editorial Board Member, *IEEE Software*, 1997 & 1998
Associate Editor in Chief, *IEEE Software*, 1995 & 1996
Area Editor: Databases, *IEEE Computer*, 1993 & 1994

Conference Involvement: Leadership Role

Steering Committee Member, *ACM Conf. on Information & Knowledge Management (CIKM)*, 1995–2011
Steering Committee Co-Chair, *ACM/ICST Int’l Conf. On Scalable Information Systems (INFOSCALE)*, 2005–2009
Co-General Chair, *IEEE Third Int’l Symp. on Network Computing & Applications*, 2004
Program Chair for Information Retrieval, *ACM Conf. on Information & Knowledge Management (CIKM)*, 2003.
Co-General Chair, *IEEE Sixth Conf. on Computer & Communications Networks (IC3N)*, 1997.
Co-Program Chair, *IEEE Fifth Conf. on Computer & Communications Networks (IC3N)*, 1996.
Co-Program Chair, *IEEE Fourth Symp. on Assessment of Software Tools*, 1996.
Tutorial Chair, *IEEE Second Conf. on Multimedia Computing Systems*, 1995.
Program Committee Vice-Chair, *IEEE Fifth Conf. on Data Engineering*, 1989.

Conference Involvement: Committee Participation Role

Program Committee, *AAAI Conf. on Artificial Intelligence*, 2016, 2017, 2018
Program Committee, *ACM Digital Health*, 2015
Program Committee, *ACM (SIGIR) Conf. on Res. & Dev. in Information Retrieval*, 1993, 2001, 2003–2007, 2010–2013
Program Committee, *ACM (CIKM) Conf. on Information & Knowledge Management*, 1995–2008, 2010
Program Committee, *IEEE Int’l Symp. on Network Computing & Applications*, 2005–2008
Program Committee, *Int’l Symp. High Performance Computing*, 1999, 2000, 2002. 2003
Program Committee, *IEEE (IC3N) Conf. on Computer & Communications Networks*, 1993–2000, 2002, 2003
Program Committee, *IEEE International Symposium on Network Computing and Applications*, 2001, 2002
Program Committee, *International Conference on Web Information Systems Engineering*, 2001, 2002
Program Committee, *IEEE Data Engineering Conf.*, 1988, 1996, 1998.
Program Committee, *ACM/IEEE Conf. on Systems Integration*, 1992, 1994

Research Presentations Given

Conference Keynote

Keynote, IEEE Artificial Intelligence & Knowledge Engineering, September 27, 2018
Keynote, IEEE Int'l Conf. on Cognitive Informatics & Cognitive Computing, July 26, 2017
Keynote, IEEE/WIC/ACM Int'l Conf. on Web Intelligence, November 18, 2013
Keynote, IEEE Next Generation Information Technology Systems (NGITS), June 17, 2009
Keynote, World Congress in Comp. Sci. Comp. Eng. & Appl. Comp. (WORLDCOMP), July 14, 2008
Keynote, Int'l Conference on Wireless Algorithms, Systems and Applications, August 2, 2007
Keynote, Workshop on Large-Scale Distributed Systems for Information Retrieval, July 27, 2007
Keynote, Descartes Conf. on Mathematical Models in Counterterrorism, US Capitol, September 29, 2006
Keynote, SPIE Electronic Imaging: Document Recognition and Retrieval XIII, January 19, 2006
Keynote, IEEE Int'l Symposium on Network Computing and Applications (NCA-03), April 18, 2003
Keynote, ACM Int'l Conf. on Information and Knowledge Management (CIKM), November 5, 2002
Keynote, IEEE Int'l Conf. on Information Technology: Coding and Computing, April 8, 2002

University/Industry/Government Distinguished Lecturer

Distinguished Lecture, Ohio State University (Elect. & Comp. Eng. Dept.), December 5, 2017
Distinguished Lecture, University of California - Irvine (Institute for Future Health), October 30, 2017
Distinguished Lecture, University of Waterloo (School of Computing), October 20, 2016
2016 NASA Ames Summer Series, Ames Research Center, July 12, 2016
Distinguished Lecture, University of Houston (Comp. Sci. Dept.), February 8, 2016
Distinguished Lecture, 2014 Louisiana Distinguished Lecture, University of Louisiana, February 21, 2014
Distinguished Lecture, University of Maryland Baltimore County (Inf. Sys. Dept.), November 13, 2013
Distinguished Lecture, College of William and Mary (Comp. Sci. Dept.), November 2, 2012
Distinguished Lecture, Temple University (Comp. & Inf. Sys. Dept.), February 15, 2012
Distinguished Lecture, Purdue University Discovery Park Cyber Center, April 19, 2010
Distinguished Lecture, Information Science & Technology Center, Colorado State Univ., April 20, 2009
Distinguished Lecture, National Autonomous University of Mexico (UNAM), August 20, 2008
Royden B. Davis, S.J., Lecture, Georgetown University, April 17, 2008
Distinguished Lecture, 6th Shanghai International Industrial Fair Forum, November 3, 2004
Midnight Seminar (Distinguished Lecture), Telcordia Technologies (formerly Bellcore), February 18, 2004.
School of Computer Science Commencement Speaker, Southern Adventist University, 2000

ACM/IEEE Distinguished Lecturer

University of Louisville (IEEE Distinguished Lecture Series), 2006
Florida International University (IEEE Distinguished Lecture Series), 2005
DePaul University (ACM Distinguished Lecturer), 2004
University of Central Florida (ACM Distinguished Lecturer), 2003 & 2004
Florida Institute of Technology (ACM Distinguished Lecturer), 2003
University of Nevada – Reno (IEEE Distinguished Visitor), 2001

Industrial and Government Laboratories Talks

America Online, Arab Academy of Science and Technology (Egypt), Argonne National Laboratories, Army Research Laboratory, AT&T Bell Laboratories, BAE Systems, Bell Communications Research (Bellcore), Equifax Corporation, Food and Drug Administration (FDA), Fujitsu Laboratories (Japan), General Dynamics Advanced Information Systems, Harris Information Systems Division, IBM German Software Development Laboratory, IBM Scientific Center Haifa (Israel), IBM T. J. Watson Research Center, IIT Research Institute - Lanham, Institute for Defense Analysis, Instituto Gulbenkian de Ciencia (Portugal), Japan Electrical Industrial Development Association, Jet Propulsion Laboratories, J. P. Morgan Bank - Parallel Technology Division, Lawrence Livermore National Laboratory, Lexis-Nexis, SiTEL of Medstar Health, The MITRE Corporation, Mitsubishi Laboratories (Japan), Motorola, National Institutes of Health, NASA Goddard Space Flight Center, NEC Research Institute, PRT Corporation of America, Space and Naval Warfare (SPAWAR) Systems Center Pacific, Telcordia Technologies, Telemarc Corporation, Tribune Corporation, Twitter, Inc., Yahoo! Research Labs – Barcelona (Spain)

University Talks

Al-Akhawayn University (Morocco), Bar-Ilan University (Israel), Ben-Gurion University (Israel), Carnegie Mellon University, Case Western Reserve University, Central Connecticut State University, City University of New York - Graduate Center, Colorado School of Mines, Emory University, ETH – Zurich (Switzerland), Fu Jen Catholic University (Taiwan), George Mason University, Georgetown University, George Washington University, Georgia Institute of Technology, Harvey Mudd College, Illinois Institute of Technology, Israel Institute of Technology (Israel), Lehigh University, Louisiana State University, Massachusetts Institute of Technology, Milwaukee School of Engineering, National Tsinghua University (Taiwan), New Jersey Institute of Technology, Northwestern University, Purdue University, Rangsit University (Thailand), Rensselaer Polytechnic Institute, Rutgers University, Shanghai Jiao Tong University (China), Stevens Institute of Technology, SUNY at Buffalo, Syracuse University, University Autonomous Metropolitan (UAM – Mexico), University of Bremen (Germany), University of California at Irvine, University of California at Santa Barbara, University of Chicago, University of Colorado at Colorado Springs, University of Illinois at Chicago, University of Illinois at Urbana-Champaign, University of Louisiana at Lafayette, University of Maryland, University of Maryland Baltimore County, University of Minnesota, University of Notre Dame, University of Pennsylvania, University of Tokyo (Japan).

Ph.D. Dissertation Supervision

1. Fotios N. Barlos, DOME: Dynamic Optimization on Multiprocessor Engines - A Statistical Approach, Ph.D. Thesis, George Mason University, May 1993.
2. Kyeongmo S. Park, Parallel Heuristic Approaches to Multiprocessor Data Allocation, Ph.D. Thesis, George Mason University, August 1994. (Co-thesis advisor: Dr. Arun Sood)
3. W. Addison Woods, LTC (Army), Data Organization, Scheduling, and Presentation in Parallel Information Retrieval Architectures, Ph.D. Thesis, George Mason University, May 1995.
4. Tieng K. Yap, High Performance Computing in Genetics, Ph.D. Thesis, George Mason University, May 1995.
5. David Grossman, Integrating Structured Data and Text: A Relational Approach, Ph.D. Thesis, George Mason University, December 1995.
6. Anthony Ruocco, LTC (Army), Parallel Clustering and Classification of Monolithic and Non-Monolithic Document Bases, Ph.D. Thesis, George Mason University, May 1996.
7. Sorin G. Nastea, Parallel Solutions for Sparse Matrix Computations, Ph.D. Thesis, George Mason University, December 1996.
8. Alaa Sheta, Identification and Control of Dynamical Systems Using Genetic Algorithms, Ph.D. Thesis, George Mason University, August 1997. (Co-thesis advisor: Dr. Kenneth De Jong)
9. Carol Lundquist, Relational Information Retrieval: Using Relevance Feedback and Parallelism to Improve Accuracy and Performance, Ph.D. Thesis, George Mason University, December 1997.
10. Brian Willard, Large Scale Information Retrieval Systems: Resolving Memory Leaks in Non-Cooperative Server Applications, Ph.D. Thesis, Florida Institute of Technology, May 1998.
11. Richard James, Performance Considerations for Information Filtering Systems Using Database Technology, Ph.D. Thesis, Florida Institute of Technology, May 1998.
12. Nicole Melander, Multiple Document Summarization for Written Argumentative Discourse, Ph.D. Thesis, George Mason University, August 1999.
13. Kenneth Alford, LTC (Army), Parallel Information Retrieval and Visualization on Large, Unstructured Document Collections Using Web Link Information, Ph.D. Thesis, George Mason University, May 2000. (Co-thesis advisor: Dr. Jim Chen)
14. M. Catherine McCabe, Information Extraction and Fusion for Information Retrieval Effectiveness, Ph.D. Thesis, George Mason University, August 2000.
15. Abdur Chowdhury, On the Design of Reliable and Efficient Information Servers, Ph.D. Thesis, Illinois Institute of Technology, May 2001.
16. Salim Mounir Alaoui, On the Clustering, Fusion, and Balanced Distribution of Data for Information Retrieval, Ph.D. Thesis, Florida Institute of Technology, May 2002. (Co-thesis advisor: Dr. Phil Bernhard)
17. Mohammed Aljlal, On Arabic Search: The Effectiveness of Monolingual and Bidirectional Information Retrieval, Ph.D. Thesis, Illinois Institute of Technology, July 2002.
18. Vincent Nguyen, Channel Alternation and Rotation for Sectorized Wireless Systems, Ph.D. Thesis, Illinois Institute of Technology, May 2003. (Co-thesis advisor: Dr. Peng-Jun Wan)
19. S. Kagan Agun, Hardware Assisted Pruned Inverted Index Component Design and Implementation, Ph.D. Thesis, Illinois Institute of Technology, December 2004.
20. Steven Beitzel, On Understanding and Classifying Web Queries, Ph.D. Thesis, Illinois Institute of Technology, May 2006.
21. Eric Jensen, Repeatable Evaluation of Information Retrieval Effectiveness in Dynamic Environments, Ph.D. Thesis, Illinois Institute of Technology, May 2006.
22. Eric Burger, Ubiquitous Reach and Remote Control of Devices, Ph.D. Thesis, Illinois Institute of Technology, May 2006.
23. Rebecca Cathey, On Scalable Search, Ph.D. Thesis, Illinois Institute of Technology, December 2007.
24. Jay Urbain, Multievidentiary Models for Genomics Search, Ph.D. Thesis, Illinois Institute of Technology, December 2008.
25. Dongmei Jia, Improving Search Quality in Peer-to-Peer File Sharing Systems, Ph.D. Thesis, Illinois Institute of Technology, December 2008. (Co-thesis advisor: Dr. Wai Gen Yee)
26. Linh Nguyen, Improving the Accuracy and Efficiency of Result Retrieval in Peer-to-Peer Networks, Ph.D. Thesis, Illinois Institute of Technology, May 2009. (Co-thesis advisor: Dr. Wai Gen Yee)
27. Tayo Obafemi-Ajayi, Computational Models for Historical Document Image Enhancement, Ph.D. Thesis, Illinois Institute of Technology, December 2010. (Co-thesis advisor: Dr. Gady Agam)

28. Jon Parker, Effective and Efficient Binarization of Degraded Document Images, Ph.D. Thesis, Georgetown University, May 2016.
29. Jason Soo, Search in Adverse Environments, Ph.D. Thesis, Georgetown University, May 2016.
30. Andrew Yates, Identifying Real World Concepts in Social Media, Ph.D. Thesis, Georgetown University, May 2016. (Co-thesis advisor: Dr. Nazli Goharian)

MS Thesis Supervision

1. Lynn Allen, Exploiting Database Technology in Medical Arenas: A Critical Assessment of PACS, New Jersey Institute of Technology, May 1991.
2. James Villani, Design and Development of a Parallel Protocol Verification System Prototype for a Hypercube Multicomputer, George Mason University, May 1993.
3. Ajay Gupte, Compression Within a Context-Sensitive Commercial Random Access Domain, George Mason University, May 1993.
4. Elizabeth Pulley, A Text Preprocessor for Relevance Ranking in the Relational Model, George Mason University, May 1994.
5. John Reichert, Implementation Details of Relevance Feedback in an Information Retrieval Systems, George Mason University, December 1996.
6. Abdur Chowdhury, DRS: A Fault Tolerant Network Routing System For Mission Critical Distributed Applications, George Mason University, December 1996.
7. Kashyap Kamdar, Pathfinder: Document Information Retrieval from Heterogeneous Platforms, Florida Institute of Technology, May 1998.
8. Wei Guan, Internal-Based Timing Constraints with Non-Uniform Distribution of Event Occurrence, Illinois Institute of Technology, July 2005.

International (European) Patent

- “Dynamic Memory Reclamation without Programmer, Compiler or Linker Assistance”. Assignee: Northrop Grumman Corporation. **EPO Patent #EP0959409 B1**. Issued June 25, 2003. (Co-Inventor: B. Willard)
- “Remote Control of Device by Telephone or Other Communication Devices,” Assignee: Dialogic Corporation. **EPO Patent #EP1989866 B1**. January 3, 2018. (Co-Inventor: E. Burger)
- “Method and System for Managing Information on Mobile Devices,” Assignee: Georgetown University. **EPO Patent # EP2702719**. January 24, 2018. (Co-Inventors: M. Sherr and J. Wilberding)

US Patents and Patent Applications

1. “Dynamic Algorithm Selection for Isocontour and Body Extraction within a Multiple Instruction Multiple Data Multiprocessor”. Assignee: The United States of America as represented by the Secretary of the Air Force. **US Patent #5,201,035**. April 6, 1993. (Co-Inventor: M. R. Stytz.)
2. “Dynamic Query Optimization Using Partial Information”. Assignee: Bell Communications Research, Inc. **US Patent #5,335,345**. August 2, 1994. (Co-Inventor: G. Frieder.)
3. “Parallel Document Clustering Process”. Assignee: The United States of America as represented by the Secretary of the Army. **US Patent #5,864,855**. January 26, 1999. (Co-Inventor: A. Ruocco.)
4. “Dynamic Memory Reclamation without Programmer, Compiler or Linker Assistance”. Assignee: Northrop Grumman Corporation. **US Patent #6,125,434**. September 26, 2000. (Co-Inventor: B. Willard.)
5. “Multiple Engine Information Retrieval and Visualization System”. Assignee: Harris Corporation. **US Patent #6,574,632**. June 3, 2003. (Co-Inventors: K. Fox, M. Knepper, J. Nemethy, E. Snowberg, G. Cusick, and R. Killam)
6. “Multiple Engine Information Retrieval and Visualization System”. Assignee: Harris Corporation. **US Patent #6,701,318**. March 2, 2004. (Co-Inventors: K. Fox, M. Knepper, J. Nemethy, E. Snowberg, G. Cusick, and R. Killam.)
7. “Optimal Placement of Wavelength Converters in Trees and Trees of Rings,” Assignee: Illinois Institute of Technology. **US Patent #6,772,102**. August 3, 2004. (Co-Inventors: P-J Wan and L. Liu)
8. “Technique for Establishing a Virtual Backbone in an Ad Hoc Wireless Network,” Assignee: Illinois Institute of Technology. **US Patent #6,839,541**. January 4, 2005. (Co-Inventors: K. Alzoubi and P.-J. Wan)
9. “Intranet Mediator,” Assignee: Illinois Institute of Technology. **US Patent #6,904,428**. June 7, 2005. (Co-Inventor: D. Grossman)
10. “Detection of Misuse of Authorized Access in an Information Retrieval System,” Assignee: Illinois Institute of Technology. **US Patent #7,299,496**. November 20, 2007. (Co-Inventor: D. Grossman)
11. “System and Method for Providing User Input Information to Multiple Independent, Concurrent Applications,” Assignee: Dialogic Corporation. **US Patent #7,406,696**. July 29, 2008. (Co-Inventor: E. Burger)
12. “Method and Kits for Managing Diagnosis and Therapeutics of Bacterial Infections,” Assignees: Northwestern University and Illinois Institute of Technology. **US Patent #7,418,399**. August 26, 2008. (Co-Inventor: A. Schaeffer)
13. “Automatic Generation of Document Summaries through Use of Structured Text”. Assignee: Oracle Corporation. **US Patent #7,509,572**. March 24, 2009. (Co-Inventor: N. Melander)
14. “Hardware Assisted Pruned Inverted Index Component,” Assignee: Illinois Institute of Technology. **US Patent #7,533,245**. May 12, 2009. (Co-Inventor: S. K. Agun)
15. “Method for Improving Local Descriptors in Peer-to-Peer File Sharing”, Assignee: Illinois Institute of Technology. **US Patent #7,558,789**. July 7, 2009. (Co-Inventor: W. G. Yee).
16. “Method for Re-Ranking Documents Retrieved from a Multi-Lingual Document Database.” Assignee: Harris Corporation. **US Patent #7,603,353**. October 13, 2009. (Co-Inventors: K. Fox and M. Knepper)
17. “Method for the Construction and Utilization of a Medical Records System,” Assignee: Northwestern University and Illinois Institute of Technology. **US Patent #7,627,489**. December 1, 2009. (Co-Inventor: A. Schaeffer)
18. “System for Similar Document Detection”. Assignee: Alion Science and Technology Corporation. **US Patent #7,660,819**. February 9, 2010. (Co-Inventor: A. Chowdhury)
19. “Hierarchical Structured Abstract File System,” Assignee: Illinois Institute of Technology. **US Patent #7,720,869**. May 18, 2010. (Co-Inventors: S. Kapoor and N. Kirubanandan)
20. “Peer-to-Peer File Sharing,” Assignee: Illinois Institute of Technology. **US Patent #7,779,006**. August 17, 2010. (Co-Inventor: W. G. Yee).
21. “Image-Based Indexing and Classification in Image Databases,” Assignee: Illinois Institute of Technology. **US Patent #7,787,711**. August 31, 2010. (Co-Inventor: G. Agam).

22. "Method for Re-Ranking Documents Retrieved from a Document Database." Assignee: Harris Corporation. **US Patent #7,801,887**. September 21, 2010. (Co-Inventors: K. Fox and M. Knepper.)
23. "Method for Domain Identification of Documents in a Document Database." Assignee: Harris Corporation. **US Patent #7,814,105**. October 12, 2010. (Co-Inventors: K. Fox and M. Knepper.)
24. "Peer-to-Peer File Sharing." Assignee: Illinois Institute of Technology. **US Patent #7,860,876**. December 28, 2010. (Co-Inventor: W. G. Yee).
25. "Remote Control of Device by Telephone or Other Communication Devices," Assignee: Dialogic Corporation. **US Patent #7,885,272**. February 8, 2011. (Co-Inventor: E. Burger)
26. "Automatic Generation of Document Summaries through Use of Structured Text". Assignee: Oracle Corporation. **US Patent #8,032,827**. October 4, 2011. (Co-Inventor: N. Melander)
27. "System for Similar Document Detection". Assignee: Alion Science and Technology Corporation. **US Patent #8,131,724**. March 6, 2012. (Co-Inventor: A. Chowdhury)
28. "Process to Allocate Channels in a Sectorized Cellular Network," Assignee: Illinois Institute of Technology. **US Patent #8,165,591**. April 24, 2012. (Co-Inventors: V. Nguyen and P.-J. Wan)
29. "Process to Allocate Channels in a Sectorized and Tiered Cellular Network," Assignee: Illinois Institute of Technology. **US Patent #8,195,172**. June 5, 2012. (Co-Inventors: V. Nguyen and P.-J. Wan)
30. "Hierarchical Structured Abstract Data Organization System," Assignee: Illinois Institute of Technology. **US Patent #8,209,358**. June 26, 2012. (Co-Inventor: S. Kapoor)
31. "Refined Permission Constraints Using Internal and External Data Extraction in a Role-Based Access Control System," Assignee: Illinois Institute of Technology. **US Patent #8,271,527**. September 18, 2012. (Co-Inventor: S. Ren)
32. "Automated Forensic Document Signatures," Assignee: Georgetown University. **US Patent #8,280,905**. October 2, 2012. (Co-Inventors: T. C. Shields and M. Maloof)
33. "System and Method for Providing User Input Information to Multiple Independent, Concurrent Applications," Assignee: Dialogic Corporation. **US Patent #8,286,190**. October 9, 2012. (Co-Inventor: E. Burger)
34. "Automated Forensic Document Signatures," Assignee: Georgetown University. **US Patent #8,312,023**. November 13, 2012. (Co-Inventors: T. C. Shields and M. Maloof)
35. "Automated Forensic Document Signatures," Assignee: Georgetown University. **US Patent #8,438,174**. May 7, 2013. (Co-inventors: T. C. Shields and M. Maloof)
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187. A. Cohan, L. Soldaini, A. Yates, N. Goharian, and O. Frieder, "On clinical decision support", Proceedings of the 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics, Newport Beach, CA, September 2014. (short paper)
188. A. Yates, N. Goharian, and O. Frieder, "Extracting Adverse Drug Reactions from Social Media," *Twenty-Ninth AAAI Conference on Artificial Intelligence (AAAI)*, Austin, TX, January 2015.
189. P.J. Wan, B. Xu, L. Wang, S. Ji and O. Frieder, "A New Paradigm for Multiflow in Wireless Networks: Theory and Applications," *IEEE Thirty-Fourth International Conference on Computer Communications (INFOCOM)*, Hong Kong, China, April 2015.
190. P.J. Wan, F. Al-Dhelaan, S. Ji, L. Wang and O. Frieder, "Flow-Based Feasibility Test of Linear Interference Alignment with Arbitrary Interference Topology," *IEEE Thirty-Fourth International Conference on Computer Communications (INFOCOM)*, Hong Kong, China, April 2015.
191. L. Soldaini, A. Cohan, A. Yates, N. Goharian, O. Frieder, "Retrieving Medical Literature for Clinical Decision Support", *37th European Conference on Information Retrieval (ECIR)*, Vienna, Austria, April 2015.
192. J. Soo and O. Frieder, "Revisiting Known-Item Retrieval in Degraded Document Collections," *Document Recognition and Retrieval XXIII (Part of the IS&T/SPIE International Symposium on Electronic Imaging)*, San Francisco, California, February 2016.
193. J. Soo and O. Frieder, "Searching Corrupted Document Collections," *Twelfth IAPR Document Analysis Systems (DAS)*, Santorini, Greece, April 2016.
194. A. Yates, N. Goharian, and O. Frieder, "Learning the Relationships between Drug, Symptom, and Medical Condition Mentions in Social Media," *AAAI Tenth International Conference on Web and Social Media (ICWSM-16)*, Cologne, Germany, May 2016. (Short Paper)
195. A. Yates, A. Kolcz, N. Goharian, and O. Frieder, "Effects of Sampling on Twitter Trend Detection," *Tenth Language Resources and Evaluation Conference (LREC-2016)*, Portoroz, Slovenia, May 2016.
196. G. Coppersmith, C. Hilland, O. Frieder, and R. Leary, "Scalable Mental Health Analysis in the Clinical Whitespace Via Natural Language Processing," *IEEE Fourth International Conference on Biomedical and Health Informatics (BHI-2017)*, Orlando, Florida, February 2017.

197. E. Yang, D. Grossman, O. Frieder, and R. Yurchak, "Effectiveness Results for Popular e-Discovery Algorithms," *AAAI Sixteenth International Conference on Artificial Intelligence and Law (ICAIL-2017)*, London, England, June 2017. (Short Paper)
198. S. MacAvaney, A. Yates, A. Cohan, L. Soldaini, K. Hui, N. Goharian, and O. Frieder, "Characterizing Question Facets from Complex Answer Retrieval", *ACM Forty-First Conference on Research and Development in Information Retrieval (SIGIR)*, Ann Arbor, Michigan, July 2018. (Short Paper)
199. E. Yang, D. Lewis, O. Frieder, D. Grossman, and R. Yurchak, "Retrieval and Richness when Querying by Document," *Design of Experimental Search & Information Retrieval Systems (DESIRES-2018)*, Bertinoro, Italy, August 2018.
200. M. Catena, O. Frieder and N. Tonellotto, "Efficient Energy Management in Distributed Web Search," *ACM Twenty-Seventh Conference on Information and Knowledge Management (CIKM)*, Turin, Italy, October 2018. (short paper)

Chapters in Books

201. C. K. Baru, O. Frieder, D. Kandlur, and M. E. Segal, "Join on a Cube: Analysis, Simulation, and Implementation," in *Database Machines and Knowledge Base Machines*, edited by M. Kitsuregawa and H. Tanaka, Kluwer Academic Publishers, Boston, 1988.
202. H. T. Siegelmann and O. Frieder, "Document Allocation in Multiprocessor Information Retrieval Systems," in *Advanced Database Systems*, edited by N. R. Adam and B. K. Bhargava, LNCS-759, Springer Verlag, 1993.
203. F. Barlos, O. Frieder, and G. Frieder, "Query Optimization for Multiprocessor/Distributed Databases: A Statistical Approach," in *Parallel Computing: Paradigms and Applications*, edited by A. Zomaya, Chapman & Hall, London, 1996.
204. T. K. Yap, O. Frieder, and R. L. Martino, "Parallel Computation in Biomedicine: Genetic and Protein Sequence Analysis," in *Handbook of Parallel and Distributed Computing*, edited by A. Zomaya, McGraw-Hill, 1996.
205. T. El-Ghazawi, O. Frieder, J. Gaber, and S. Alaoui, "Parallel Task Mapping with Biological Computing Models," in *Solutions to Parallel and Distributed Computing Problems: Lessons from Biological Sciences*, edited by A. Zomaya, John Wiley & Sons, Canada, 2001.
206. S. Beitzel, E. Jensen, A. Chowdhury, D. Grossman, N. Goharian, and O. Frieder, "Recent Results on Fusion of Effective Retrieval Strategies in the Same Information Retrieval System," *Distributed Multimedia Information Retrieval*, edited by J. Callan, F. Crestani, and M. Sanderson, Springer-Verlag, LNCS-2924, 2003.
207. G. Calinescu, O. Frieder, P.-J. Wan, "A Survey on Algorithms for Power Assignment in Wireless Ad Hoc Networks," *Handbook on Theoretical and Algorithmic Aspects of Sensor, Ad Hoc Wireless, and Peer-to-Peer Networks*, edited by J. Wu, Auerbach Publishers, 2005.
208. O. Frieder, "On Searching in the "Real World", *Computational Methods for Counterterrorism*, edited by S. Argamon and N. Howard, Springer Verlag, 2009.

Encyclopedia Entries:

209. Encyclopedia of Algorithms (Springer, 2008)
 - P.-J. Wan, X.-Y. Li, G. Calinescu, and O. Frieder, "Minimum Energy Broadcast in Wireless Networks"
210. Encyclopedia of Database Systems (Springer, 2009)
 - A. Full Entries
 - E. Jensen, S. Beitzel, and O. Frieder, "Effectiveness Involving Multiple Queries"
 - S. Beitzel, E. Jensen, and O. Frieder, "Index Creation and File Structures"
 - B. Brief Entries
 - S. Beitzel, E. Jensen, and O. Frieder, "Average Precision Histogram"
 - S. Beitzel, E. Jensen, and O. Frieder, "Average R-Precision"
 - S. Beitzel, E. Jensen, and O. Frieder, "Mean Average Precision (MAP)"

- S. Beitzel, E. Jensen, and O. Frieder, "Geometric Mean Average Precision (GMAP)"

Invited Publications:

211. O. Frieder, K. C. Lee, and V. Mak, "JAS: A Parallel VLSI Architecture for Text Processing," *IEEE Database Engineering*, 8(1), March 1989.
212. A. Zomaya, T. El-Ghazawi, and O. Frieder, "Guest Editor's Introduction: Parallel and Distributed Computing for Data Mining," *IEEE Concurrency*, 7(4), October - December 1999.
213. O. Frieder, D. Grossman, A. Chowdhury, and G. Frieder, "Efficiency Considerations in Very Large Information Retrieval Servers," *Journal of Digital Information, (British Computer Society)*, 1(5), April 2000.
214. O. Frieder, A. Chowdhury, D. Grossman, M.C. McCabe. "On the Integration of Structured Data and Text: A Review of the SIRE Architecture." *DELOS Workshop on Information Seeking, Searching, and Querying in Digital Libraries*, Zurich, Switzerland, December 2000.
215. D. Grossman and O. Frieder, "Divide and Conquer," *Intelligent Enterprise*, 4(12), August 10, 2001.
216. D. Grossman and O. Frieder, "How to get that Unstructured Information into your Data Warehouse," *Intelligent Enterprise*, 4(14), September 18, 2001.
217. D. Grossman and O. Frieder, "How to get that Unstructured Information into your Data Warehouse, Continued," *Intelligent Enterprise*, 4(16), October 24, 2001.
218. O. Frieder, D. Grossman, and A. Chowdhury, "On Scalable Information Retrieval Systems," Paper Corresponding to Frieder Keynote Presentation, *IEEE Second International Symposium on Network Computing and Applications*, Cambridge, Massachusetts, April 2003.
219. G. Agam, S. Argamon, O. Frieder, D. Grossman, D. Lewis, "Complex Document Information Processing: Prototype, Test Collection, and Evaluation," Paper Corresponding to Frieder Invited Presentation, *Document Recognition and Retrieval XIII (Part of the IS&T/SPIE International Symposium on Electronic Imaging)*, San Jose, California, January 2006.
220. O. Frieder, "On Scalable (Computer Based) Information Systems," *ASIS&T Bulletin*, December/January 2008.

TREC Publications:

221. D. Grossman, D. Holmes, and O. Frieder, "A Parallel DBMS Approach to IR in TREC-3," *Overview of the Third Text Retrieval Conference (TREC-3)*, NIST Special Publication 500-225, November 1994.
222. D. Grossman, D. Holmes, O. Frieder, M. Nguyen, and C. Kingsbury, "Improving Accuracy and Run-Time Performance for TREC-4," *Overview of the Fourth Text Retrieval Conference (TREC-4)*, NIST Special Publication 500-236, November 1995.
223. D. Grossman, J. Reichart, A. Chowdhury, C. Lundquist, D. Holmes, and O. Frieder "Using Relevance Feedback within the Relational Model for TREC-5" *Overview of the Fifth Text Retrieval Conference (TREC-5)*, NIST Special Publication 500-238, November 1996.
224. C. Lundquist, D. Holmes, D. Grossman, O. Frieder, and M. C. McCabe, "Expanding Relevance Feedback in the Relational Model," *Overview of the Sixth Text Retrieval Conference (TREC-6)*, NIST Special Publication 500-240, November 1997.
225. D. Holmes, M. C. McCabe, D. Grossman, A. Chowdhury, and O. Frieder, "Use of Query Concepts and Information Extraction to Improve Information Retrieval Effectiveness," *Overview of the Seventh Text Retrieval Conference (TREC-7)*, NIST Special Publication 500-242, November 1998.
226. M. C. McCabe, D. Holmes, K. Alford, A. Chowdhury, D. Grossman, and O. Frieder, "IIT at TREC-8: Improving Baseline Precision," *Overview of the Eighth Text Retrieval Conference (TREC-8)*, NIST Special Publication 500-246, November 1999.
227. A. Chowdhury, S. Beitzel, E. Jensen, M. Sai-lee, D. Grossman, O. Frieder, M. C. McCabe, and D. Holmes, "IIT at TREC-9: Entity Based Feedback with Fusion," *Overview of the Ninth Text Retrieval Conference (TREC-9)*, NIST Special Publication 500-249, November 2000.
228. M. Aljlayl, S. Beitzel, E. Jensen, A. Chowdhury, Holmes, M. Lee, D. Grossman, and O. Frieder, D. "IIT at TREC-10," *Overview of the Tenth Text Retrieval Conference (TREC-10)*, NIST Special Publication 500-250, November 2001.

229. A. Chowdhury, M. Aljlayl, E. Jensen, S. Beitzel, D. Grossman, and O. Frieder, "IIT at TREC-2002: Linear Combinations Based on Document Structure and Varied Stemming for Arabic Retrieval," *Overview of the Eleventh Text Retrieval Conference (TREC-11)*, NIST Special Publication 500-251, November 2002.
230. S. Beitzel, E. Jensen, R. Cathey, L. Ma, D. Grossman, O. Frieder, A. Chowdhury, G. Pass, H. Vandermolén, "IIT at TREC-2003: Task Classification & Document Structure for Known-Item Search", *Overview of the Twelfth Text Retrieval Conference (TREC-12)*, NIST Special Publication 500-255, November 2003.
231. J. Heard, O. Frieder, and D. Grossman, "IIT at TREC 2004 Standard Retrieval Models Over Partitioned Indices for the Terabyte Track," *Overview of the Thirteenth Text Retrieval Conference (TREC-13)*, NIST Special Publication 500-261, November 2004.
232. J. Urbain, N. Goharian, and O. Frieder, "IIT TREC 2005: Genomics Track," *Overview of the Fourteenth Text Retrieval Conference (TREC-14)*, NIST Special Publication 500-266, November 2005.
233. J. Urbain, N. Goharian, and O. Frieder, "IIT TREC 2006: Genomics Track," *Overview of the Fifteenth Text Retrieval Conference (TREC-15)*, NIST Special Publication 500-272, November 2006.
234. J. Urbain, N. Goharian, and O. Frieder, "IIT TREC 2007 Genomics Track: Using Concept-Based Semantics in Context for Genomics Literature Passage Retrieval," *Overview of the Sixteenth Text Retrieval Conference (TREC-16)*, NIST Special Publication 500-274, November 2007.
235. A. Yates, D. DeBoer, H. Yang, N. Goharian, S. Kunath, and O. Frieder, "(Not Too) Personalized Learning to Rank for Contextual Suggestion", *Overview of the Twenty-First Text Retrieval Conference (TREC-21)*, NIST Special Publication 500-298, November 2012.
236. L. Soldaini, A. Cohan, A. Yates, N. Goharian, and O. Frieder, "Query Reformulation for Clinical Decision Support Search", *Overview of the Twenty-Third Text Retrieval Conference (TREC-23)*, NIST Special Publication 500-308, November 2014.

Selected List of Research Funding¹

1. "Multicomputer Relational Query Processing and its Application to Protocol Verification,"
Database and Communication Systems, Inc./Virginia Center for Innovative Technology
Principal Investigator (CCR-91-57785)
January 1, 1991 - June 30, 1992 \$ 37,093
2. "Parallel Verification Systems for Highly-Complex Communications Protocols,"
National Science Foundation
Principal Investigator
September 1, 1991 - February 28, 1994 \$ 54,998
3. "CISE Research Instrumentation:
Exploiting Mixed Performance Characteristics: A Heterogeneous Hypercube System,"
National Science Foundation (\$ 57,100) / George Mason University (\$ 28,550)
(Principal Investigator: A. K. Sood, Co-Principal Investigator: O. Frieder)
May 1, 1992 - October 31, 1993 \$ 85,650
4. "Network Design and Optimization,"
Telemarc, Inc./Virginia Center for Innovative Technology
Principal Investigator
February 10, 1993 - October 9, 1993 \$ 25,000
5. "1993 National Young Investigator Award,"
National Science Foundation
Principal Investigator
September 1, 1993 - February 28, 2000 \$ 312,500
6. "Educating Engineers to Design Complex Systems,"
National Science Foundation
(Principal Investigator: P. Denning, Co-Principal Investigators: C. Dede, O. Frieder,
J. Gentle, C. Jensen, M. Kafatos, D. Menasce', D. Rine, and J. Wallin)
October 1, 1993 - September 30, 1995 \$ 156,000
7. "High Performance Network Protocols and Information Retrieval Services,"
XPAND Corporation/Virginia Center for Innovative Technology
Principal Investigator
October 18, 1993 - October 31, 1994 \$ 38,839
8. "A Scientific and Technical Evaluation of EOSDIS Core System for Earth Science Research,"
Hughes Applied Information Systems (HAIS)
(Principal Investigator: M. Kafatos, Co-Principal Investigators: O. Frieder, L. Kerschberg,
G. Michaels, B. Moore, D. Menasce', J. Shukla, and F. Webster)
March 1, 1994 - August 31, 1994 \$ 329,022
9. "Research Opportunity Award: Parallelism in Information Retrieval,"
National Science Foundation
Principal Investigator
August 1, 1994 - July 31, 1995 \$ 8,015

¹ I did not pursue any funding prior to September 1990 since funding requests were forbidden at Bellcore.

10.	"Implementing Relevance Ranking Using Logicon's LMDS," Logicon Operating Systems Principal Investigator October 12, 1994 - October 31, 1995	\$ 39,615
11.	The Telephone Connection, Inc. Principal Investigator	\$ 85,633
	A. "High Transaction Volume Telecommunications Databases," November 1, 1994 - October 31, 1995	\$ 26,730
	B. "High Volume Call Processing," July 1, 1995 - September 30, 1996	\$ 29,403
	C. "Customized Telecommunication Access Patterns," July 10, 1995 - October 31, 1995	\$ 11,500
	D. "A Fault Tolerant Dynamic Routing System" May 26, 1996 - August 31, 1996	\$ 18,000
12.	Harris Corporation Principal Investigator	\$ 113,008
	A. "Database and Data Processing Research" August 1, 1996 - May 14, 1997	\$ 23,370
	B. "Information Systems Research" May 15, 1997 - June 30, 1997	\$ 20,730
	C. "Integration of Text with Databases" July 1, 1997 - June 30, 1998	\$ 68,908
13.	IIT Research Institute (subcontracts from US Government grants) Principal Investigator	\$ 322,698
	A. "EMPIRE: An Online Medical Library" US Army (subcontract) October 1, 1998 - March 29, 2000 (\$75,000 & \$116,699)	\$ 191,699
	B. "On the Design of an Alternative Medicine Information Retrieval System" National Institutes of Health - NCCAM (subcontract) October 1, 1998 - September 30, 1999 (\$40,000 & \$66,000)	\$ 106,000
	C. "Data Warehouse Scalability Study" January 1, 2000 - June 30, 2000	\$ 24,999
14.	"An Educational Metasearch Engine," Sun Microsystems, Inc. (Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman) June 1, 2000 - May 31, 2001	\$ 39,400
15.	"User Interface Design for a Scalable Data Warehouse," Hitech Component Distributors (HiTechCafe.com) (Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman) August 1, 2000 - July 31, 2001	\$ 94,000
16.	"Research Infrastructure for Distributed System Development" DARPA (Principal Investigator: X. Sun, Co-Principal Investigators: O. Frieder, P. Dickens, C. Hood, H. Zhang) January 1, 2001 - December 31, 2002	\$ 173,000

17. "Next Generation Search of the World Wide Web,"
Hitech Component Distributors (HiTechCafe.com)
(Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman)
August 1, 2001 - July 31, 2003 \$ 600,000

18. "Acquisition of a Computing Cluster and Access Grid Node for Information Technology Research"
National Science Foundation
(Principal Investigator: X. Sun, Co-Principal Investigators: O. Frieder, P. Dickens, C. Hood, H. Zhang)
September 15, 2001 - August 31, 2003 \$ 175,333

19. "Textual-Geospatial Integration Services for NSDL"
National Science Foundation (sub-contract from UCSB – Terry Smith, Principal Investigator)
(Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman)
October 1, 2001 - September 30, 2003 \$ 152,205

20. "University Research Outreach: Information Technology Tools"
In-Q-Tel
(Principal Investigator: D. Grossman, Co-Principal Investigator: O. Frieder)
February 7, 2002 – February 6, 2003 \$155,213

21. "Lockheed Martin Subcontract RRMCS0753 - JAILYARD Program"
Lockheed Martin
(Principal Investigator: D. Grossman, Co-Principal Investigator: O. Frieder)
October 3, 2002 – October 1, 2004 \$263,642

22. "Arabic Stemmer License Agreement"
Blue Shoe Technologies
(Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman)
June 1, 2003 – September 30, 2004 \$64,000

23. "Extending CS Undergraduate Curriculum to Include Data Mining and Information Retrieval"
National Science Foundation
(Principal Investigator: Ophir Frieder, Co-Principal Investigators: N. Goharian, D. Grossman, N. Raju)
September 1, 2001 - July 31, 2005 \$ 339,500

24. "Collaborative Project: Completing a Center of Excellence in Information Assurance at IIT"
National Science Foundation
(Principal Investigator: D. Grossman, Co-Principal Investigator: O. Frieder)
August 1, 2003 - July 31, 2005 \$ 144,000

25. "Research Support for Doctoral Students"
America Online
(Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman)
September 1, 2003 – August 31, 2006 \$192,000

26. "CRCD/EI: An Undergraduate CS Specialization in Knowledge Management Systems"
National Science Foundation
(Principal Investigator: S. Argamon, Co-PI: O. Frieder, N. Goharian, D. Grossman, N. Raju)
October 1, 2004 – September 30, 2007 \$281,999

27.	BitSystems, Inc. (subcontracts from US Government grants) (Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman)	\$ 995,000
	<ul style="list-style-type: none"> • “A Scalable Search Engine” August 1, 2000 - July 31, 2001 \$ 30,000 • “Using a Relational DBMS to Implement an XML Query Language” January 1, 2001 - September 30, 2001 \$ 60,000 • “Using a Relational DBMS to Implement an XML Query Language: Phase II” July 1, 2001 - September 30, 2001 \$ 60,000 • “Using a Relational DBMS to Implement an XML Query Language: Phase III” October 1, 2001 – September 30, 2002 \$ 120,000 • “Using a Relational DBMS to Implement an XML Query Language: Phase IV” October 1, 2002 – September 30, 2003 \$ 120,000 • “Using a Relational DBMS to Implement an XML Query Language: Phase V” October 1, 2003 – September 30, 2004 \$ 120,000 • “Using a Relational DBMS to Implement an XML Query Language: Phase VI” October 1, 2004 – July 31, 2009 \$ 485,000 	
28.	“Search Scalability Evaluation” Northrop-Grumman – subcontract from the “Survivor Program” (Principal Investigator: D. Grossman, Co-Principal Investigator: O. Frieder) September 24, 2004 – September 30, 2005	\$120,000
29.	“Complex Document Information Processing” ARDA (Principal Investigator: O. Frieder, Co-Principal Investigators: G. Agam, S. Argamon, and D. Grossman) March 12, 2005 – September 30, 2007	\$ 1,295,000
30.	“Knowledge Dissemination and Discovery (“KDD”) Challenge Problem Evaluation” IBM (Principal Investigator: S. Argamon, Co-Principal Investigators: O. Frieder and D. Grossman) July 1, 2005 – September 30, 2005	\$ 61,575
31.	“KDD Intranet Mediation” National Science Foundation – Supplement (Principal Investigator: O. Frieder, Co-Principal Investigators: G. Agam, S. Argamon, and D. Grossman) August 1, 2006 – July 31, 2007	\$ 175,000
32.	“Information Retrieval on a Parallel Database Machine” Netezza Corporation – Equipment Grant (Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman) October 1, 2007 – September 30, 2008	\$ 291,400
33.	“On the Scalability of Search Systems” Advanced Systems Engineering Corporation (Principal Investigator: O. Frieder, Co-Principal Investigator: D. Grossman) February 1, 2008 – February 28, 2009	\$ 300,000
34.	“Acquisition of a Computing Cluster and Storage for Information Technology Research” National Science Foundation (Principal Investigator: X. Sun, Co-Principal Investigators: O. Frieder, C. Hood, Z. Lan, and H. Zhang) May 1, 2008 - April 30, 2011	\$ 331,003

35. "Improving Forensic Triage with Rapid Text Document Similarity Matching" \$ 367,081
 Naval Postgraduate School
 (Principal Investigator: C. Shields, Co-Principal Investigators: O. Frieder, M. Maloof, and M. Sherr)
 October 2010 – October 2011 (NSSC NPS N00244-11-1-0008) \$ 175,361
 August 2011 – July 2012 (N00104-11-M-Q978) \$ 191,720
36. "Scalable Robust Metaphor Identification" \$ 81,376
 IARPA – sub contract from IIT (years 1 & 2)
 Georgetown University Principal Investigator
 April 1, 2012 – January 31, 2014
37. "II-NEW: Infrastructure for Change: From a Teaching Department to National Prominence," \$ 460,000
 National Science Foundation
 (Principal Investigator: O. Frieder, Co-Principal Investigators: N. Goharian, M. Maloof, M. Sherr, C. Shields)
 July 1, 2012 – June 30, 2014.
38. "NeTS: Small: Collaborative Research: Maximizing Network Capacity in Multihop Wireless \$ 160,000
 MIMO Networks,"
 National Science Foundation
 (Linked NSF Proposal; Project PI: P.-J. Wan; Georgetown University Principal Investigator: O. Frieder)
 September 1, 2012 – August 31, 2015.
39. "Improving Partial Text Matching with Space-efficient Probabilistic Token Storage" \$ 331,985
 Naval Postgraduate School
 (Principal Investigator: C. Shields, Co-Principal Investigators: O. Frieder, M. Maloof, and M. Sherr)
 September 2013 – July 2015
40. "I/UCRC: S2ERC at Georgetown University" \$ 1,023,810
 National Science Foundation
 (Principal Investigator: O. Frieder, Co-Principal Investigator: E. Burger)
 April 1, 2014 – March 31, 2019.
41. "Strategic Planning Tools for Staging Malaria Elimination" \$ 125,000
 Bill and Melinda Gates Foundation (subcontract from Oxford University)
 (Principal Investigator: O. Frieder)
 September 1, 2014 – August 31, 2019
42. "Information Fusion and Inference Tools in Medical Application \$ 420,000
 Applying State of Being to Healthcare"
 DARPA
 (Principal Investigator: O. Frieder)
 August 1, 2015 – January 31, 2017
43. "EAGER: Guaranteed-Secure and Searchable Genomic Data Repositories" \$ 99,999
 National Science Foundation
 (Principal Investigator: A. O'Neill, Co-Principal Investigator: O. Frieder)
 September 1, 2016 – February 28, 2019
44. "Brain Science Research – Improving Tomorrow's Healthcare" \$1,179,090
 The Brain Sciences Foundation
 (Principal Investigator: O. Frieder)
 April 1, 2017 – March 31, 2020