

# Alexander Haubold

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<http://www.aquaphoenix.com>

## Objective:

Experienced researcher and developer with expertise in the fields of information retrieval, multi-modal data mining, computer vision, and medical imaging. Extensive knowledge and experience in identifying, researching, developing, and building systems in Java/C/Matlab/SQL for information analysis, extraction, indexing, and dissemination. Seeking challenging position in research in which I can apply my analytical and creative skills.

## Education:

**Ph.D.** in Computer Science, received May 2008

Columbia University – Graduate School of Arts and Sciences, New York, NY

Thesis: “Indexing and Browsing Unstructured Videos using Visual, Audio, Textual, and Facial Cues”; Advisor: Prof. John R. Kender.

**M.S.** in Computer Science, received May 2003 (GPA: 4.1 / 4.0)

Columbia University – School of Engineering and Applied Science, New York, NY

**B.S.** in Computer Science, received May 2001 (GPA: 3.6 / 4.0)

Columbia University – School of Engineering and Applied Science, New York, NY

## Research Experience:

**Post-Doctoral Research Scientist**, since July 2008

Brain Imaging Lab, Division of Child Psychiatry, NY State Psychiatric Institute, New York, NY

- Research supervised approaches for automatic classification of psychiatric disorders from multi-modal brain images (Anatomical MRI, functional MRI, Diffusion Tensor Images, Spectroscopy Images). Apply data mining techniques to the large dataset: create n-degree discriminant classifiers, evaluate classification performance, and compare to SVM classifiers.
- Prepare large datasets by applying various normalization, warping, and template registration methods.
- Use MATLAB to perform computational analyses. The set of scripts includes various libraries for disk reading and data caching designed to scalably cope with the large dataset of 3D images.
- Develop a UI-based Java application, with OpenGL 3D brain visualization, to make automatic classification approach available to clinical testing of new subjects.

**Graduate Research Assistant**, September 2003 – May 2008

Department of Computer Science, Columbia University, New York, NY

- Researched, implemented, and evaluated novel approaches for analysis, segmentation, indexing, and visualization of lecture and presentation videos. Specialized in areas of shot segmentation in unedited videos, clustering of shots based on visual content similarity, shot classification into known categories, speaker segmentation, speaker clustering, text filtering and keyword mining from highly inaccurate audio transcripts, and text to speech alignment.
- Performed computational analyses and experiments in MATLAB.
- Developed video indexing system in C with FFmpeg libraries, which performs all aspects of content extraction and indexing from the video and audio tracks of the video.
- Developed multi-threaded server-side applications in Java for video content search and retrieval, MPEG video streaming. Leveraged MySQL as a database for the indexed structured content.
- Developed multi-threaded video browser in Java with user-level video permissions, video content retrieval, and software-level platform-independent MPEG decoder/player.

- Continuously evaluated indexing approaches and browser user interface in a 3-year classroom user study with over 1,000 students and a database of more than 300 hours of video.

**Graduate Research Intern, June – September 2007**

Intelligent Information Analysis, IBM TJ Watson Research Center, Hawthorne, NY

- Researched semantic similarity measures in WordNet and their application to visual concept-based video content search. Identified significant flaws in fundamental representation of information content, based on outdated text corpora. Proposed alternative information theory approaches leveraging the WWW as the largest available text corpus.
- Developed Perl scripts to query Google for all WordNet concepts and to create a database of vocabulary usage from which information content is computed.
- Developed C++ components for semantic visual concept-based search.
- Competed in TRECVID 2007 video retrieval search tasks.

**Graduate Research Intern, June – September 2005**

Intelligent Information Analysis, IBM TJ Watson Research Center, Hawthorne, NY

- Researched, implemented, and evaluated approaches for improving visual concept-based video search using semantic similarity methods. Mapped transcripts to automatically detected video concepts and performed machine learning of semantic relationships between text and concepts.
- Designed, implemented, and evaluated novel features for summarizing motion in video shots and applying it to concept-based classification.
- Competed in TRECVID 2005 video retrieval search tasks. Achieved the highest ranks for concept detection and video search in 2005 competition.

**Software Researcher and Developer, June 1999 – May 2007**

Media Center for Art History, Columbia University, New York, NY

- Developed an integrated structured database, file, and website management application to effectively manage and publish growing visual media repository. Application features interactive tools for structured database design, data entry and management, file transfer, and website template customization. Does not require user to have skills in SQL or CGI-script programming.
- Developed original management tool in Perl and MySQL. Transformed to a multi-threaded Java-based server and a Java-based browser using RMI and SSL as secure communication platforms.
- Used extensively since 1999 for enhancing core curriculum Art Humanities courses by creating on-line image databases. More than 10,000 graduate and undergraduate students from several universities have used the web sites supported by the developed architecture on clustered servers.

**Professional Experience:**

**Lab Manager, September 2000 – May 2007**

Columbia University - School of Engineering and Applied Science, New York, NY

- Managed two computer design labs with a total of 60 SGI machines (later replaced with PC workstations). The labs were intensively used for 3D modeling and animation in Computer Science, Mechanical, Chemical, Biomedical, Civil, and Environmental Engineering.
- Supervised 15+ person staff responsible for accommodating 10+ professors and 500+ students per year in the laboratory.
- Set-up and maintained SGI Onyx, Challenge, and Origin servers; O2, Indy, and Indigo workstations. Performed IRIX OS upgrades, hardware repair, software and license installations, as well as user account management.
- Designed, developed, and implemented custom software in Perl, TK, and Java, to aid in user account management, network monitoring, and intrusion detection as well as a camera security system in C and Perl to monitor and record lab activity.

**Co-founder and Technical Developer, 1999 - 2000**

eColl Network LLP, New York, NY

- Co-founded internet service company specializing on on-line services targeted at Columbia University students. The company and its products were sold to a business that offered services to a large community of universities.
- Designed and implemented on-line tools, such as a “Textbook Auction”, “Restaurant Menu Order”, and “Ride Share” in Perl CGI. Web site used by more than 2,500 students in a semester.

**Summer Intern, Equity IT, June – August 2001**

Credit Suisse First Boston, New York, NY

- Designed and developed a web-based broker voting platform for use by medium and small sized investment and management firms. Met with company clients to solicit customer requirements during the design process.
- Developed code in Java, JSP, and servlets, with support for an underlying MySQL, Oracle, and/or Sybase database.

**Summer Analyst, Fixed Income, Currency and Commodities, June – August 2000**

Goldman Sachs & Co, New York, NY

- Developed support software for the development team in FICC research.
- Developed an automatic nightly build and result notification tool.
- Designed Java application to graphically evaluate statistical data for web page access times.

**Summer Intern, Center for Development in Electronics (PSE EZE PN), June – July 1998**

Siemens, Vienna, Austria

- Investigated implementation for telephone switchboard using experimental API.
- Designed departmental web site.

**Teaching Experience:**

**Course Instructor**, “ENGI E1102 – Design Fundamentals using Advanced Computer Technologies”, Columbia University – School of Engineering and Applied Science, New York, NY, September 2001 – May 2007

**Course Instructor**, “W3101 – Programming Languages in Java”, Columbia University – Department of Computer Science, New York, NY, September – October 2005

**Invited Workshop Lecturer**, “Image and Audio Processing using Matlab”, UAE University, Al Ain, UAE, November 21-22, 2005.

**Invited Workshop Lecturer**, “Introduction to Matlab”, St. Thomas College, Pala, Kerala, India, March 17-18, 2005.

**Community Service:**

**Software Developer Consultant**, September 2004 – present

Comprehensive Math and Science Program, New York, NY

- Designed and developed interactive software application for algebra practice, including equation solving, factoring, operations on monomial and polynomials, angular and linear measuring, unit conversions, and others. The tool is aimed at selected New York public school students in grades 7 through 12 to prepare for the New York State Regents Exam in Mathematics.
- Developed multi-threaded server-side Java application used by teachers to assign, collect, and evaluate automatically generated practice sets, and multi-threaded client-side Java application used by students to retrieve and complete exercises.
- Designed symbolic calculation component and mathematical expression GUI entry widget.

**Project Manager**, June 2004 – August 2006

New York City Department of Parks and Recreation

- Supervised and instructed more than 80 high school students in designing playground equipment and a greenhouse for disabled children for Marcus Garvey Park / PS79M.
- Successfully lead re-design, construction, and testing of full-scale wheelchair swing, which is expected to be introduced at PS79M.

**Project Manager**, September 2003 - 2005

Wildlife Conservation Society

- Supervised 10-30 students on semesterly IT projects for the New York zoos. Projects include designing interactive on- and off-line tools for people with mobile, visual, and auditory disabilities, and an e-commerce prototype for an on-line shop.

**Skill Set:**

**Programming:** C/C++, Java, JSP, Perl, Tk, PHP, SQL, Pascal, HTML/CGI, OpenGL

**Software:** Adobe Photoshop, Adobe Premiere, Alias Studio Tools, EDS I-DEAS, Apache Web Server, Matlab, MS Office, MySQL

**Systems:** UNIX: Solaris, IRIX, Linux; DOS, Windows NT/XP

**Languages:** German (fluent), French (basic)

**Other:** Practical experience in machining (mills, lathes, etc.) and rapid prototyping (ABS plastic)

**Publications:** (see <http://www.aquaphoenix.com/publications>)

- **A. Haubold**, B.S. Peterson, M.M. Weissman, R. Bansal, Classifying Individuals among Psychiatric Disorders using Multimodal MR Images, *in submission*.
- P. Dutta, **A. Haubold**, Audio-based Classification of Speaker Characteristics, *IEEE Conference on Multimedia and Expo (ICME '09)*, New York, NY, June 28 - July 3, 2009, pp. 422-425.
- **A. Haubold**, P. Dutta, J.R. Kender, Evaluation of Video Browser Features and User Interaction with VAST MM, *ACM Multimedia Conference (MM '08)*, Vancouver, Canada, October 27-31, 2008, pp. 449-458.
- **A. Haubold**, A. Natsev, Web-based Information Content and its Application to Concept-based Video Retrieval, *ACM Conference on Image and Video Retrieval (CIVR '08)*, Niagara Falls, NY, July 7-9, 2008, pp. 437-446.
- **A. Haubold**, J.R. Kender, Accommodating Sample Size Effect on Similarity Measures in Speaker Clustering, *IEEE Conference on Multimedia and Expo (ICME '08)*, Hannover, Germany, June 23-26, 2008, pp. 1525-1528.
- R. Carlucci, **A. Haubold**, J. Stynes, Pursuing the Full Potential of Digital Technology for Art & Architectural History: The Visual Media Center at Columbia University, *Teaching Art History with New Technologies: Reflections and Case Studies*, Cambridge Scholars Publishing, January 2008, pp. 57-68.
- M. Campbell, **A. Haubold**, M. Liu, A. Natsev, J.R. Smith, J. Tešić, L. Xie, R. Yan, J. Yang, IBM Research TRECVID-2007 Video Retrieval System, *NIST TRECVID 2007 Workshop (TRECVID '07)*, Gaithersburg, MD, November 5-6, 2007.
- **A. Haubold**, Matlab for First-year College Engineers, *Frontiers in Education Conference (FIE '07)*, Milwaukee, WI, October 10-13, 2007, pp. F1H 7-12.
- P. Dutta, **A. Haubold**, A Model for Teaching Engineering Design, *Frontiers in Education Conference (FIE '07)*, Milwaukee, WI, October 10-13, 2007, pp. S2J 14-19.

- P. Dutta, **A. Haubold**, Case Studies of two Projects pertaining to Information Technology and Assistive Devices, *Frontiers in Education (FIE '07)*, Milwaukee, WI, October 10-13, 2007, pp. T2J 9-14.
- Natsev, **A. Haubold**, J. Tešić, L. Xie, R. Yan, Semantic concept-based query expansion and re-ranking for multimedia retrieval, *ACM Multimedia Conference (MM '07)*, Augsburg, Germany, September 24-29, 2007, pp. 991-1000.
- **A. Haubold**, J.R. Kender, VAST MM: Multimedia Browser for Presentation Video, *ACM Conference on Image and Video Retrieval (CIVR '07)*, Amsterdam, The Netherlands, July 9-11, 2007, pp. 41-48.
- **A. Haubold**, M.R. Naphade, Classification of Video Events using 4-dimensional time-compressed Motion Features, *ACM Conference on Image and Video Retrieval (CIVR '07)*, Amsterdam, The Netherlands, July 9-11, 2007, pp. 178-185.
- **A. Haubold**, J.R. Kender, Alignment of Speech to Highly Imperfect Text Transcriptions, *IEEE Conference on Multimedia and Expo (ICME '07)*, Beijing, China, July 2-5, 2007, pp. 224-227.
- **A. Haubold**, J.R. Kender, Analysis, User Interface, and their Evaluation for Student Presentation Videos, *IEEE Conference on Multimedia and Expo (ICME '07)*, Beijing, China, July 2-5, 2007, pp. 863-866.
- **A. Haubold**, Selection and Ranking of Text from Highly Imperfect Transcripts for Retrieval of Video Content, *ACM Conference on Research and Development in Information Retrieval (SIGIR '07)*, Amsterdam, The Netherlands, July 23-27, 2007, pp. 791-792.
- **A. Haubold**, J.R. Kender, Introduction of Video Journals and Archives in the Classroom, *ASEE Annual Conference & Exhibition (ASEE '07)*, Honolulu, HI, June 24-27, 2007, AC 2007-1694.
- P. Dutta, **A. Haubold**, Engineering Design via Team-based Service-Learning Projects: Case Survey of Five Unique Project Genres, *ASEE Annual Conference & Exhibition (ASEE '07)*, Honolulu, HI, June 24-27, 2007, AC 2007-1704.
- P. Dutta, **A. Haubold**, Management and Archival for Project-based Courses, *ASEE Annual Conference & Exhibition (ASEE '07)*, Honolulu, HI, June 24-27, 2007, AC 2007-1692.
- P. Dutta, **A. Haubold**, Use of Assessment Survey to Assign Project Teams and Roles, *ASEE Annual Conference & Exhibition (ASEE '07)*, Honolulu, HI, June 24-27, 2007, AC 2007-1699.
- **A. Haubold**, User Interfaces for LED Lamps, *LED Journal, Vol. 2(2)*, March 2007, p. 30.
- **A. Haubold**, LED Lighting Control and Interface, *Controlling Light Conference*, San Diego, CA, December 4-5, 2006.
- M. Campbell, **A. Haubold**, S. Ebadollahi, M.R. Naphade, A. Natsev, J.R. Smith, J. Tešić, L. Xie, IBM Research TRECVID-2006 Video Retrieval System, *NIST TRECVID 2006 Workshop (TRECVID '06)* Gaithersburg, MD, November 13-14, 2006.
- **A. Haubold**, A. Natsev, M.R. Naphade, Semantic Multimedia Retrieval Using Lexical Query Expansion and Model-based Reranking, *IEEE Conference on Multimedia and Expo (ICME '06)*, Toronto, CA, July 9-12, 2006, pp. 1761-1764.
- Amir, J. Argillander, M. Campbell, **A. Haubold**, G. Iyengar, S. Ebadollahi, F. Kang, M.R. Naphade, A. Natsev, J.R. Smith, J. Tešić, T. Volkmer, IBM Research TRECVID-2005 Video Retrieval System, *NIST TRECVID 2005 Workshop (TRECVID '05)*, Gaithersburg, MD, November 14-15, 2005.
- **A. Haubold**, J.R. Kender, Augmented Segmentation and Visualization for Presentation Videos, *ACM Multimedia Conference (MM '05)*, Singapore, November 6-11, 2005, pp. 51-60.
- **A. Haubold**, J.R. Kender, Analysis and Visualization of Index Words from Audio Transcripts of Instructional Videos, *IEEE International Workshop on Multimedia Content-based Analysis and Retrieval (MCBAR '04)*, Miami, FL, December 13-15, 2004, pp. 570-573.

- **A. Haubold**, Visualization for Periodic Population Movement between Distinct Localities, *IEEE Symposium on Information Visualization (InfoVis '03)*, Seattle, WA, October 19-21, 2003.
- **A. Haubold**, J.R. Kender, Analysis and Interface for Instructional Video, *IEEE Conference on Multimedia and Expo (ICME '03)*, Baltimore, MD, July 6-9, 2003, pp. 705-708.

**References:**

Upon request