

Drexel L. Hallaway

Senior Systems Engineer, iGPS Products, Metris USA
Ph.D. Candidate, Computer Science, Columbia University

Home: 20124 Lazy River Terrace, #202

Ashburn, VA 20147-2289

Cell: +1 571 232 9965

drexel@cs.columbia.edu

<http://www1.cs.columbia.edu/~drexel/>

Research Interests

3D metrology, augmented and virtual reality, tracking, adaptive user interfaces, networked virtual and augmented environments, language-level tools for object replication.

Engineering Employment

Senior Systems Engineer, iGPS Products, Metris USA, Inc.

May, 2004–present

- **Principal research engineer** for high-precision, long- and short-range, laser-based metrology systems, applied typically in aerospace and automotive, with clients like Boeing, Bombardier, and Volkswagen.
- **Representative activities:** Designing experiments; analyzing data (e.g., model-data-fitting least-squares optimizations); graphical and mathematical simulation of system and its components; analysis and critical review of theoretical models of a 3D-geometrical and sometimes electronic sort, proposing extensions to / generalizations of such; revision of component-calibration algorithms; coding research and production algorithms – low-level firmware up through GUIs – in contexts like Matlab, C#.NET, C/C++, Java. Hired and retained to think creatively about hard problems....
- **Results:** Significant improvements to system theory, firmware performance the accuracies we can claim and deliver, and improved system usability / stability in reflective environments.

Education

Ph.D. Candidate, Computer Science, Columbia University

January, 2000–present

- **Advisor:** Prof. Steven Feiner.
- **Courses or comprehensive examinations:** Analysis of Algorithms, Artificial Intelligence, Combinatorial Theory, Computer Architecture, Computer Graphics, Database Systems, Graph Theory, Knowledge Representation and Reasoning, Operating Systems, Programming Languages and Translators.
- **Research:** systems-level work on replicating state across networks for collaborative augmented and virtual reality applications; installation, calibration and driver development for various commercial tracking system technologies (InterSense IS-600/-900/-300, Ashtech GPS receiver, ArcSecond Constellation 3Di); invention of coarse, infrared tracking system (US Prov. Patent Appl. Serial No. 60/515,763); administration of lab's Windows domains (NT 4.0 and 2003 Server).

M.Phil. Computer Science, Columbia University (expected)

May, 2004

M.S. Computer Science, Columbia University, GPA 3.985

December, 2001

Opera Performance studies, Manhattan School of Music

1984–1986

B.A. General Studies (music, math), Hobe Sound Bible College

1977–1982 / 1998

Awards and Honors

Second Prize, Advanced Division, Palm Beach Opera Annual Vocal Competition, West Palm Beach, FL – an international competition for young singers (April, 1989).

Math Student of the Year Award, Palm Beach Community College (North Campus), West Palm Beach, FL (December, 1988).

Solo Appearance (Operatic Baritone), Birgit Nilsson Master Class, Manhattan School of Music, New York, NY (1985).

Scholarship Student, Manhattan School of Music, New York, NY (1984–86).

Full Scholarship (musical touring / PR), Hobe Sound Bible College, Hobe Sound, FL (1979–82).

Physics Award (sole recipient), Hauser High School, Hope, IN (1977).

Publications

Refereed Conference Papers:

Hallaway, D., T. Höllerer, and S. Feiner, "Coarse, Inexpensive, Infrared Tracking for Wearable Computing," *Proc. ISWC 2003 (Seventh Int'l Symp. on Wearable Computers)*, pp. 69–78, White Plains, NY, October 21–23, 2003.

Refereed Journal Papers:

Hallaway, D., T. Höllerer, and S. Feiner, "Bridging the Gaps: Hybrid Tracking for Adaptive Mobile Augmented Reality," *Applied Artificial Intelligence, Special Edition on Artificial Intelligence in Mobile Systems*, vol. 18(6), July, 2004.

Höllerer, T., S. Feiner, D. Hallaway, B. Bell, M. Lanzagorta, D. Brown, S. Julier, Y. Baillet, and L. Rosenblum, "User Interface Management Techniques for Collaborative Mobile Augmented Reality," *Computers & Graphics*, vol. 25(5), pp. 799–810, October, 2001.

Höllerer, T., S. Feiner, T. Terauchi, G. Rashid, and D. Hallaway, "Exploring MARS: Developing Indoor and Outdoor User Interfaces to a Mobile Augmented Reality System," *Computers & Graphics*, vol. 23(6), pp. 779–785, December, 1999.

Refereed Workshop Papers:

Höllerer, T., D. Hallaway, N. Tinna, and S. Feiner, "Steps Toward Accommodating Variable Position Tracking Accuracy in a Mobile Augmented Reality System," *Proc. AIMS 2001 (Second Int'l Workshop on Artificial Intelligence in Mobile Systems)*, pp. 31–37, Seattle, WA, August 4, 2001.

Demonstrations

Feiner, S., B. Bell, H. Benko, G. Blasko, S. Güven, D. Hallaway, T. Höllerer, and S. Lok, "Mobile Augmented Reality," *Living with the Genie: Governing Scientific and Technological Transformation in the 21st Century*, Columbia University, New York, NY, March 5–7, 2002.

Feiner, S., B. Bell, S. Güven, D. Hallaway, T. Höllerer, S. Lok, A. Olwal, J. Tang, N. Tinna, and R. Yamamoto, "Mobile Augmented Reality Systems," *IEEE and ACM ISAR 2001 (Int'l Symposium on Augmented Reality)*, New York, NY, Oct. 30, 2001.

Feiner, S., B. Bell, E. Gagas, S. Güven, D. Hallaway, T. Höllerer, S. Lok, N. Tinna, R. Yamamoto, S. Julier, Y. Baillet, D. Brown, M. Lanzagorta, A. Butz, E. Foxlin, M. Harrington, L. Naimark, and D. Wormell, "Mobile Augmented Reality Systems," *Juried Exhibit, ACM SIGGRAPH 2001, Emerging Technologies*, Los Angeles, CA, Aug. 12–17, 2001.

Feiner, S., T. Höllerer, E. Gagas, D. Hallaway, S. Julier, Y. Baillet, D. Brown, and M. Lanzagorta, "Distributed 3D Graphics on Wearable Computers," *IEEE ISWC 2000 (Fourth Int'l Symposium on Wearable Computers)*, Atlanta, GA, Oct. 18–21, 2000.

Feiner, S., T. Höllerer, E. Gagas, D. Hallaway, and T. Terauchi, "Multi-User Mobile Augmented Reality Systems," *ACM and Intel Computing Continuum Conference 2000*, San Francisco, CA, March 14–17, 2000.

Professional Activities (CS)**Conference Publications Assistant:** VR 2000 (IEEE Virtual Reality).**Conference Paper Reviewer:** ACM I3D 2003 (SIGGRAPH Symp. on Interactive 3D Graphics), IEEE ISWC 2003 (Seventh Int'l Symp. on Wearable Computers), IEEE VR 2004 (Virtual Reality).**Teaching Experience****Teaching Assistant**, Columbia University, Dept. of Computer Science, Fall 2003: *CS W4170: User Interface Design* (Prof. S. Feiner). Helped design homework problems and prepare course material. Graded homework and exams. Prepared for and lectured at one class session.**Teaching Assistant**, Columbia University, Dept. of Computer Science, Spring 2000: *CS W4160: Computer Graphics* (Prof. S. Feiner). Helped create homework problems and prepare course material. Graded homework and exams. Prepared for and lectured at one class session.**Adjunct Vocal Instructor**, Indian River Community College (Florida), 1991.**Student Teaching**, Hobe Sound Bible College, Music Department, 1980: the sole instructor for the private voice lessons a few younger students were taking for credit.**Financial Employment****NatWest Securities Corporation, New York, NY** **1995-1998**
Associate, Restaurants & Gaming. Equity research coverage of the restaurant and gaming industries. Co-authored company and industry reports; created and maintained earnings models and valuations; had frequent contact with company managements and institutional clients. During my work with Damon Brundage, we progressed from unranked, through #8 (1996), to #5 (1997), in the Restaurant sector of Institutional Investor's annual poll.**PaineWebber Incorporated, New York, NY** **1994-1995**
Assistant, Equity Research. Wireless and wireline telecommunications services sectors.**LeafStone, Inc., New York, NY** **1993**
Temporary-services firm: project assignments at TIAA-CREF, Morgan Stanley and PaineWebber.**Operatic Performance (Lyric Baritone)****Palm Beach Opera**

Papageno	<i>The Magic Flute</i> (Mozart)	March, 1994
Schaunard	<i>La Bohème</i> (Puccini)	March, 1993
Papageno	<i>Papageno</i> (Mozart/Diack), educational tour	October, 1992
Father	<i>Hänsel & Gretel</i> (Humperdinck), educational tour	April, 1992
Dr. Malatesta	<i>Don Pasquale</i> (Donizetti)	March, 1992
Barone Duophol	<i>La Traviata</i> (Verdi)	January, 1992
Wolf/Woodsman	<i>Little Red Riding Hood</i> (Barab), educational tour	April, 1991
Sharpless	<i>Madama Butterfly</i> (Puccini)	March, 1991
Boy 2 (Trio)	<i>Trouble in Tahiti</i> (Bernstein), concert style	February, 1991
Calandrino	<i>The Goose of Cairo</i> (Mozart), educational tour	April, 1990
Ben	<i>The Telephone</i> (Menotti), concert style	November, 1989
Brack Weaver	<i>Down in the Valley</i> (Weill), concert style	November, 1989
Dandini	<i>Cinderella</i> (Rossini), educational tour	April, 1989
Roucher	<i>Andrea Chénier</i> (Giordano)	March, 1989
Conte Ceprano	<i>Rigoletto</i> (Verdi)	January, 1989
Morales/El Dancaïro	<i>Carmen</i> (Bizet)	December, 1988
Spalanzani/Hermann	<i>Les Contes d'Hoffmann</i> (Offenbach)	March, 1988
Figaro	<i>The Barber of Seville</i> (Rossini), educational tour	April, 1984
Compañía Opera de Monterrey (Monterrey, Nuevo Leon, Mexico)		
Silvio	<i>I Pagliacci</i> (Leoncavallo)	May, 1993
Schaunard	<i>La Bohème</i> (Puccini)	June, 1990

Tampa Bay Opera Corp.		
Sharpless	<i>Madama Butterfly</i> (Puccini)	October, 1991
Gilbert & Sullivan Light Opera Society		
Escamillo	<i>Carmen</i> (Bizet)	January, 1991
Gilbert & Sullivan Light Opera Society		
James Cox	<i>Cox & Box</i> (Sullivan)	December, 1990
Manhattan School of Music		
Mr. Plunkett	<i>The English Cat</i> (Henze), New York première	February, 1986
Hämerlein	<i>Feuersnot</i> (R. Strauss), New York première	December, 1985
Son/House-Servant	<i>The Nose</i> (Shostakovich), New York première	March, 1985
Menego	<i>The Inquisitive Women</i> (Wolf-Ferrari)	January, 1985

**Concert
Performance
(Lyric Baritone)**

Schubertiades at Sotheby's (London, UK)		
Solo concert	Songs of Ravel & Duparc	April, 1993
Solo concert	Songs of Barber, E. Collins, Spirituals	May, 1992
Century Villages (Florida)		
Duo concert tour	Opera arias, songs of Ravel and Irving Berlin	August, 1991
Brandeis Univ. Nat'l Women's Society (Miami, FL)		
Duo concert	Opera arias & songs from musical theater	February, 1991
Florida Symphonic Pops		
Orchestral soloist	Viennese Operetta program	July, 1990
Orchestral soloist	Musical theater program	July, 1989
J. Weiss Memorial Foundation (Melbourne, FL)		
Duo concert	Opera arias, art songs, etc.	June, 1990
Masterworks Chorus (West Palm Beach, FL)		
Orchestral soloist	<i>Requiem</i> (Brahms)	April, 1990
Northwood Inst. Nat'l Women's Board (West Palm Beach, FL)		
Solo concert	Opera arias & songs from musical theater	March, 1990
First Baptist Church (Vero Beach, FL)		
Orchestral soloist	<i>Messiah</i> (Händel)	December, 1989
Greater Palm Beach Symphony		
Orchestral soloist	<i>Coronation Mass</i> (Mozart)	March, 1989
Palm Beach Symphonette		
Orchestral soloist	<i>Requiem</i> (Fauré)	February, 1988

**Musical Career
Influences**

Vocal Instructors: Bill Shuman, Margaret Hoswell, Dr. Daniel A. Harris, Fletcher Smith, Rosemary Basham.

Conductors: Ulf Bjorlin, Elio Boncompagni, John Cacavis, Giorgio Croci, John Crosby, David Gilbert, Anton Guadagno, Steven Guadagno, Jack Jones, Seymour Schonberg.

Directors: Keith Baker, Linda Brovsky, Ken Cazan, Lou Galterio, David Gano, Franco Gratale, Scott Holderer, Sir John van Kesteren, James Lucas, Gordon McConnell, David Morelock, Francesco Privitera, Paolo Trevisi.

Master Classes and Coaches: Dalton Baldwin, Mignon Dunn, Thomas Grubb, Linda Jones, Martin Katz, Carolyn Lockwood, Birgit Nilsson, Seymour Schonberg, Martin Smith, Gary Wedow.