

PROFILE

Senior researcher (Ph.D.) and consultant for wireless/wireline data systems. Pioneering leadership for international wireless data standards working groups. Leader for composition of wireless technology roadmaps to specify wireless communications standards evolution paths and lifetimes to inform agency decision-makers. Excellent applied research and analytical problem-solving skills in the field of wireless systems. Possess excellent communication skills with substantial technical publication record in fields of middleware design, information communications technology, wireless communications network systems, and data standards for communications. Proven expertise for developing middleware, data standards, and wireless network architecture designs. Supervised testbed design and construction of an Automated Test Facility with specific emphasis upon wireless network communication across heterogeneous assets and communications quality assurance.

Strong engineering design skills from requirements definition, solution conceptualization, engineering trade-off analyses, integrated verification and validation within testbeds and experimental deployments, then report generation and dissemination to professional and public stakeholder communities. I am passionate and highly motivated to work in the field of wireless network communications as a genuinely significant and important contribution to American safety, health, and quality of life.

RESEARCH INTERESTS

- Wireless Communications Data Standards; WLAN, WPAN, IoT standardization
- LTE and Wi-Fi convergence; LTE-U for LTE economies of scale, unlicensed band utilization and improved spectral efficiency; LTE Advanced (LAA) Carrier Aggregation
- Quality of Service mechanisms for wireless and cellular 3G/4G/5G systems
- Software Defined Networks (SDN), Network Functions Virtualization (NFV), virtual network segregation for QoS and security purposes
- Internet of Things (IoT, IPSO Alliance), Radio Frequency Identification (RFID)
- Satellite Communications for augmentation of mobile wireless network coverage
- Professional membership in the IEEE, Consultative Committee for Space Data Systems (CCSDS), Internet Society (ISOC), ACM and AIAA.

EDUCATION

UNIVERSITY OF COLORADO, BOULDER, CO

- **PH.D., AEROSPACE ENGINEERING, 1997**; Cumulative GPA 3.83 / 4.00 for 139.0 credit hours.
- **M.S., AEROSPACE ENGINEERING, 1994.**
- **PURSUING M.S. IN COMPUTER SCIENCE.** Emphasis in Wireless Network Systems Design, Information Architectures and Data Analytics
- **PURSUING M.S. IN TELECOMMUNICATIONS.** Emphasis in Wireless Telecommunication Networks; Cumulative Computer Science and Telecommunications GPA 3.84 / 4.00 for 52.0 credit hours

COLORADO SCHOOL OF MINES, GOLDEN, CO

- **B.S., CHEMICAL AND PETROLEUM REFINING ENGINEERING, 1983.**

PROFESSIONAL EXPERIENCE

06/2004 – PRESENT, SENIOR RESEARCH ASSOCIATE, THEN D.C.S. GIFFORD, LLC

EMPLOYER: UNIVERSITY OF COLORADO, BOULDER, CO, THEN D.C.S. GIFFORD, LLC, FROM 03/2014 - PRESENT

PROGRAM SUPERVISORS: PATRICK FINK, patrick.w.fink@nasa.gov,
RICHARD BARTON, richard.j.barton@nasa.gov

Served as founding, then continuing member, and currently Working Group Chairman of the Consultative Committee for Space Data Standards (CCSDS) Wireless Working Group (WWG). The CCSDS is directly affiliated with the International Standards Organization (ISO).

- Composed and advocated for the Working Group Charter which was successfully accepted;
- Participated in wireless communications technology roadmap compositions to specify wireless communications standards evolution paths and lifetimes to inform agency decision-makers. The historical focus has been on 802.15 and 802.11 WLANS – under my tenure the focus now includes 3GPP 4G/5G Long Term Evolution (LTE) network systems;
- Served as primary author and document shepherd of three ratified wireless data standards documents (via CCSDS and the ISO). The WWG Wireless Communications Overview Issue 2 (ratified and published April 2015) document includes technical material regarding LTE network wireless quality of service over LTE bearers to provide priority, pre-emption and multimedia stream QoS via Guaranteed Bit Rate (GBR) and non-GBR bearers;
- Served as co-author and lead editor for a second version of the Wireless Communications Overview document. The informative document has been amended to include an comprehensive overview of 3G/4G and LTE cellular communications systems design and operation to support anticipated space agency requirements for user mobility, priority, pre-emption and quality of service across IP multimedia content streams;
- Provided engineering design review of RFID standards, composed associated technology roadmaps, and presented technical options to space-agency sponsors in advocacy for a multi-national space-agency RFID standard specification with emphasis on IoT interoperability;
- Current Wireless WG Task Items include RFID transmission and tag-naming data standards and high data rate (HDR) wireless networks standards specification for exploration class missions;
- Served as NASA-wide Rapporteur for NASA Data Standards Working Group 2007-2013;
- Served as volunteer member of the NIST PSCR Data Analytics Working Group and the NIST PSCR Location Based Services (LBS) for the Public Safety Communications Research (PSCR) program at NIST. Served as NIST External Reviewer for final LBS report (available at <http://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1883.pdf>).
- Authored six peer-reviewed articles and presented four invited presentations.

05/2008 – 09/2013 SENIOR RESEARCH ASSOCIATE

EMPLOYER: UNIVERSITY OF COLORADO, BOULDER, CO

PROGRAM SUPERVISORS:

ADAM SCHLESINGER, adam.m.schlesinger@nasa.gov, RODNEY GRUBBS, rodney.grubbs@nasa.gov

Project principal investigator (PI) for the NASA Disruption Tolerant Networking (DTN) Project.

- Advised NASA, led pioneering deployment of the DTN wireless communications protocol suite onboard the International Space Station (ISS) for experimentation, testing and analysis;
- Participated and led technical team of NASA and university researchers to design, conduct and analyze experimental DTN hybrid wireless and wireline deployments; a key published result was to design and implement Aggregate Custody Signaling (ACS) in the DTN protocol suite for improved bandwidth utilization. ACS is now a widely-accepted capability of the Internet Research Task Force DTN standard;
- Required the utilization of international problem solving and negotiation skills to successfully deploy a multi-national operational space communications system;
- Resulted in NASA and the ISS establishing a NASA Institutionalized DTN wireless communications capability for the benefit of the ISS, NASA, and International partners;
- Assisted NASA in industry RFI publication, RFP composition and RFP review;
- Authored three peer-reviewed articles and presented four invited presentations.

06/2004 – 09/2010 SENIOR RESEARCH ASSOCIATE

EMPLOYER: UNIVERSITY OF COLORADO, BOULDER, CO

PROGRAM SUPERVISOR: PATRICK FINK, patrick.w.fink@nasa.gov

Project principal investigator (PI) for the BioNet middleware architecture used for NASA and space-agency low-latency information-sharing wireless and wireline networks.

- Formed academic and government partnerships to build NASA Lunar Wireless Habitat Testbed (see 9-minute NASA video at https://www.youtube.com/watch?v=D_TTig1Oifo, “Wireless Systems for Exploration”)
- Managed development and deployment of the BioNet IP-based information-sharing architecture across NASA end-to-end mobile wireless and IoT networks via app store distribution (Apple, Android);
- Interfaced with support vendors to integrate proprietary technology and coordinate R&D aspects;
- Developed priority and pre-emption mechanisms to provide specific quality-of-service regimes for mobile wireless and wireline users of the BioNet middleware architecture;
- Resulted in the Wireless Lunar Habitat Testbed (built in 2009) serving as a primary demonstration testbed for experimentation, testing and analysis of wireless communications architectures and technologies at the NASA Johnson Space Center;
- Authored five peer-reviewed articles and presented seven invited presentations.

06/1993 – 05/2004 RESEARCH ASSOCIATE

EMPLOYER: UNIVERSITY OF COLORADO, BOULDER, CO

SUPERVISOR: ALEXANDER HOEHN, alexander.hoehn@colorado.edu

Lead Automation Engineer BioServe Space Technologies Research Center.

- Leader for all computer automation hardware and software integration, system and application programming, for CU-Boulder payloads on 12 NASA Space Shuttle missions;

- Designed, implemented, tested and deployed advanced IP-based information sharing end-to-end architectures that are currently operational 24/7 onboard the International Space Station;
- Authored three peer-reviewed articles and presented two invited presentations.

TEACHING (UNIVERSITY OF COLORADO AT BOULDER)

SEMESTER	COURSE
Spring, 2001	ASEN 4519/5519 Real-Time Data Acquisition
Spring, 2000	ASEN 4519/5519 Real-Time Data Acquisition
Spring, 2001	ASEN 4018 Senior Design Laboratory II
Fall, 2000	ASEN 4018 Senior Design Laboratory I
Spring, 2000	ASEN 4018 Senior Design Laboratory II - Co-instructor
Spring, 1998	ASEN 4018 Senior Design Laboratory II - Co-instructor
Fall, 1997	ASEN 4018 Senior Design Laboratory I - Co-instructor
Spring 1997	ASEN 5053 Rocket Propulsion – Co-instructor
1993-1996	RoboCar autonomous unmanned vehicle project co-instructor with Prof. Michael Mozer of the Department of Computer Science

	ASEN-4519 Real-time Data Acquisition, Spring 2000.			ASEN-4519 Real-time Data Acquisition, Spring 2001.			ASEN-4028 Engineering Design, Spring 2001.		
	Average	Instructor	Dept	Average	Instructor	Dept	Average	Instructor	Dept
Description	Rating	Average	Average	Rating	Average	Average	Rating	Average	Average
Presentation of material	A	3.80	3.37	A+	3.91	3.57	A+	3.90	3.57
Explanation of assignments	A	3.70	3.18	A	3.82	3.60	A+	3.90	3.60
Relevance of assignments	A+	4.00	3.72	A+	4.00	3.74	A+	4.00	3.74
Fairness of grading	A	3.67	3.56	A+	3.91	3.67	A	3.70	3.67
Treatment of ethnic/female students	A+	4.00	3.95	A	3.86	3.91	A-	3.56	3.91
Treatment of ethnic/female issues			3.80	B	3.00	3.48	A+	4.00	3.48
Accessibility of instructor	A+	4.00	3.46	A	3.82	3.63	A+	4.00	3.63
How well motivated students	A+	4.00	3.14	A+	4.00	3.54	A+	3.90	3.54
Learning experience	A+	4.00	3.49	A+	3.91	3.56	A+	4.00	3.56
Course rating	A	3.80	3.49	A	3.82	3.47	A+	4.00	3.47
Instructor rating	A+	3.90	3.28	A+	4.00	3.61	A	3.80	3.61
Workload relative to credit given		6.60	5.24		6.09	5.59		5.70	5.59

TEACHING RECOGNITIONS

Spring 2000 ASEN 4018/4028, Autonomous Spin Stabilized Imaging System (ASSIS) Senior Design Project, Aerospace Senior Design Faculty Advisor; selected best Senior Design Project in College of Engineering

1997 – 1998 ASEN 4018/4028; Ratmobile Project Senior Design Project, Aerospace Senior Design Faculty Co-advisor; selected best Senior Design Project in College of Engineering

MENTORED UNDERGRADUATE AND GRADUATE STUDENTS

STUDENT	DATES	STUDENT MENTORING PROJECTS
Bo Pearce	2009 – 2013	BioNet middleware system
Bonnie Hoffman	2010 – 2012	BioNet and DTN Graphic designer
Laura Howland	2010 – 2011	BioNet and DTN Website design and Marketing Materials
Andrew Jenkins	2007 - 2008	Delay Tolerant Networking (ECEN Ph.D. student)
Kendria Alt	2007 – 2011	Technology Transfer, Patent Assessment
James Wiu	Summer 2005	Medical device market survey
Nathan Wilcox	2003 – 2006	BioServe system administration projects
Marek Sotola	2004 – 2011	SURE and UROP projects, BioNet device developer
Chris Madsen	2003 – 2006	Flight Experiment Mission Operations and System Administration
Kunmi Ayanbule	2003 – 2004	Flight Experiment Mission Operations & Automated Scripting
Casey Brewer	2004 – 2005	Flight Experiment Mission Operations
Jon Pineau	2002 – 2003	WONDER/PTIM Flight Software Design, Implementation, & Testing
Kirsten Carpenter	2001 – 2002	Flight Experiment Mission Operations
William Kalinowski	2000 – 2002	Mission Management
Chris Haas	2000 – 2001	Automated pumping and sampling system prototype design
Karen Doty	Spring 2000	Autonomous Spin Stabilized Imaging System
Tom Arriola, Shannon Baker, Karl Brown, David Gray, Barnabas Hamer, Myke Komarnitsky, Patrick Liu, David McCann, Elise Rathgeber, Shea Williams, Sean Yarborough	1998 – 1999	Mars 2000 Rover (M2R) autonomous vehicle project
Stefan Allen, Jeff Boardmann, Matt Dew, Michael Figaro, Robert Fleming, John Gifford, Nathan Gillespie, Welton Hong, Michele Stein, Robert Steinke, Guy Stone, Jason Woodward, Ted Zieger	1997 – 1998	Ratmobile 1998 autonomous vehicle project with Prof. Dale Lawrence

Lance Wills	Summer 1996	Systems Research to Improve 1995 Award-Winning RoboCar
Adam Boggs, Jake Freeman, Kerry Kruempelstandter, Sebastian Kuzminsky, Michael Kalandros, John Scupin, Sam Stoller	1996 – 1997	RoboCar 1997 autonomous vehicle project
Adam Boggs, Fadi Dawood, Jake Freeman, Gary Haussman, Kerry Kruempelstandter, Sebastian Kuzminsky, Michael Kalandros, John Scupin, Sam Stoller	1995 – 1996	RoboCar 1996 autonomous vehicle project
Mike Deeds, Andre van der Hoek, Floyd Henning, Jake Freeman, Gary Haussman, Sebastian Kuzminsky, Sam Stoller	1994 – 1995	RoboCar 1995 autonomous vehicle project
Gregory Gruel	1995	Wiring Diagrams and DSP Improvement for RoboCar (SURE program)

LEADERSHIP SKILLS

- Improved employee morale and productivity with a Agile management process with Scrum;
- Improved software and communications product quality by supervising the research, design and specification of a Continuous Integration (CI) software build and configuration management system directly leading to repeatable, high-quality, software development and testing processes. The repeatable software development and build processes improved software quality (fewer bugs, elegance of conceptual design) and decreased development and maintenance costs;
- Instituted a formal, detailed, Annual Performance Review process for staff employees. Augmented university single-page with no comments review process, by implementing bi-annual reviews focusing on employee feedback and how to make improvements to the working environment. Formulated and led composition of staff training plans to emphasize staff involvement in the improvement of the working environment;
- Supervised the development of a very successful interview and hiring process to recruit and retain key personnel;
- Worked successfully in international data standards groups with multi-national partners that have disparate agendas and funding resources. These type of activities require two fundamental ethics in addition to trusted technical competency: fairness and consideration to lead differing constituencies to multi-stakeholder consensus;
- Overcame a critical systemic external challenge to lead NASA to implement state-of-the art communication systems to improve data and science results that would demonstrate effective use of the International Space Station. Due to NASA-centric risk averseness and minimal technology development budgets this challenge required political savvy coupled with technical competencies.

PEER-REVIEWED JOURNAL ARTICLES

1. Gifford, K.K., "Linux at the University: In Space, on the Ground, and in the Classroom", September 2000, *Linux Journal*, Issue 77.

CONFERENCE ACTIVITIES

1. Technical Chair, Consultative Committee Space Data Systems (CCSDS) 2008 Lunar Surface Wireless Communications and Navigation Workshop, Berlin, Germany, October 13, 2008.
2. Technical Chair, Consultative Committee Space Data Systems (CCSDS) 2007 Wireless Workshop, Colorado Springs, CO, January 22, 2007.

SELECTED PUBLICATIONS

1. Kearney, M., Kiely, A., Yeh, P., Gerner, J., Calzolari, G.P., Gifford, K., and Merri, M., "CCSDS – Advancing Spaceflight Technology for International Collaboration", *61st International Astronautical Congress*, Prague, CZ, IAC-10-D9.2.8, September 2010.
2. Pitts, R., Nichols, K., Holbrook, M., Gifford, K.K., Kuzminsky, S. and Jenkins, A., "DTN Implementation and Utilization Options on the International Space Station", *AIAA SpaceOps 2010*, AIAA-2010-2173, Huntsville, AL, April 2010.
3. Gifford, K.K., Williams, S., Maiorani, L., Marshall, B. and Sotola, M., "BioNet Middleware and Software framework in Support of Space Operations", *AIAA SpaceOps 2010*, AIAA-2010-2251, Huntsville, AL, April 2010.
4. Jenkins, A., Kuzminsky, S., Gifford, K.K., Pitts, R.L. and Nichols, K., "Delay/Disruption-Tolerant Networking: Flight Test Results from the International Space Station", *2010 IEEE Aerospace Conference*, March 2010.
5. Fink, P.W., Gifford, K.K., Barton, R.J., Wagner, R.S., and Ngo, P.H., "Unified Communications for Space Inventory Management", *AIAA Space Conference*, AIAA 2009-6550, Pasadena, CA, September, 2009.
6. Gifford, K.K., Braham, S., "Wireless network systems to support NASA's Exploration Vision" *AIAA InfoTech@Aerospace 2007*, Paper # AIAA-2007-2927, Rohnert Park, CA, May 2007.
7. Plancke, P., Saiz, J., Hernandez-Velasco, I., Gifford, K.K., and Carron, C., "Wireless Communications and Interfaces onboard Spacecraft" *AIAA SpaceOps 2006 Conference*, Rome, Italy, June 2006.
8. Gifford, K.K., Kuzminsky, S., Williams, S., and Saiz, J., "BioNet: A developer-centric middleware architecture for heterogeneous devices and protocols" *IEEE Wireless Communications and Networking Conference*, Las Vegas, NV, April 2006.

SELECTED INVITED PRESENTATIONS

1. Gifford, K.K. and Cerf, V. G., "Open-source DTN communication software for ISS payloads", *NASA Johnson Space Center and Boeing*, Houston TX, June 2013.

2. Gifford, K.K., "Why Middleware is an important systemic problem for NASA to overcome", *NASA Johnson Space Center*, Houston, TX, June 2013.
3. Gifford, K.K., "Utilizing the ISS as a DTN Technology Demonstration Platform", *IEEE GlobeComm 2012 Guest Panelist*, Anaheim, CA, December 2012.
4. Gifford, K.K., "DTN Overview for Space Communications and Tele-robotics", *Technical University at Munich*, Munich, Germany, April 2012.
5. Gifford, K.K., "Disruption Tolerant Networking", *IEEE New Technologies Conference (NTC)*, Seal Beach, CA, August 2011.
6. Gifford, K.K., "Wireless Communications and Standards Activities in Support of NASA's Exploration Mission", *IEEE RFID World Conference, IEEE RFID Guest Panelist*, Grapevine, TX, March, 2007.
7. Gifford, K.K., Kuzminsky, S., and Williams, S., "Architectural design implications to support wireless QoS for spacecraft applications", *ESA/ESTEC Wireless for Space Applications Workshop*, Noordwijk, The Netherlands, July 2006.

**For additional publications, press coverage, and published scientific articles:
google "kevin gifford wireless nasa iss dtn"**

TABLE 1- SPONSORED RESEARCH PROJECTS

	AGENCY	SPONSORED RESEARCH PROJECT	START DATE	END DATE	PI / Co-I	TOTAL
[1]	NASA JSC NNX11AK02G	Support of the CCSDS Wireless Working group	Oct-12	Sep-13	PI	\$20,000
[2]	NASA HQ NNX11AK02G	Support of the NASA/ESA DTN OpsCom-1 ISS Activity	Jun-12	Dec-12	PI	\$124,998
[3]	NASA JSC NNX11AK02G	Support of the CCSDS Wireless Working group	Oct-11	Sep-12	PI	\$20,000
[4]	NASA GRC NNC11VD41P	GRC Extra-Vehicular Activities radio (EVA-Radio)	Apr-11	Sep-11	PI	\$126,817
[5]	NASA HQ NNX11AK02G	NASA HQ ESA/JAXA ISS DTN Support	Oct-10	Sep-11	PI	\$255,000
[6]	NASA HQ NNX11AK02G	DTN Readiness Project - Phase 2	Oct-10	Sep-13	PI	\$2,939,995
[7]	NASA HQ NNJ05HE10G	JAXA DTN Ground Test Activities Augmentation	Nov-09	Jan-10	PI	\$50,000
[8]	NASA EPSCOR w/ Univ. of Nebraska	CU-Boulder support for the UN-Lincoln 2009 NASA EPSCOR Project	Jun-09	May-12	PI	\$100,000
[9]	NASA/JSC NNJ05HE10G	CCSDS Wireless Working Group & DTN Support for JSC Lunar Habitat Testbed	Oct-08	Sep-09	PI	\$149,906
[10]	NASA HQ NNJ05HE10G	Inter-Center Space DTN Readiness Project (Phase 1)	Jun-08	Sep-11	PI	\$2,940,985
[11]	NASA/JSC NNJ05HE10G	Lunar Habitat Wireless Testbed	Nov-07	Oct-08	PI	\$179,924
[12]	NASA/STTR w/GRC NNC07CB47C	Integrated Data Assimilation Architecture with Invocon, Inc. - Phase II \$600,000	Jul-07	May-09	PI	\$300,000
[13]	NASA/JSC NNJ05HE10G	Engineering support and representation for NASA JSC for the CCSDS data standards body	Nov-06	Apr-07	PI	\$89,236
[14]	NASA/JSC NNJ05HE10G	Wireless System Architecture (WSA)/BioNet Integrated Feasibility Assessment	Jun-06	Sep-07	PI	\$224,282
[15]	NASA/JSC NNJ05HE10G	Wireless System Architecture (WSA)/BioNet Integrated Feasibility Assessment	Feb-06	Oct-06	PI	\$49,987
[16]	NASA/STTR w/GRC NNC06CB47C	Integrated Data Assimilation Architecture with Invocon, Inc. - Phase I \$100,000	Jan-06	Dec-06	PI	\$50,000
[17]	CU Tech Transfer	POCg: BioNet, A Wireless Middleware Architecture: Commercial Market Research	Jan-06	May-06	PI	\$25,000
[18]	NASA/JSC	Wireless System Architecture (WSA) for Environmental & Physiological Monitoring	May-05	Nov-05	PI	\$100,000
[19]	NASA/MSFC	Integrated Data Assimilation Architecture for Advanced Physiological Monitoring	Jul-05	Oct-05	PI	\$70,000
[20]	Bionetics Corporation	Hardware and Software Design to Integrate the PTIM Space Flight Experiment in PGBA	Apr-03	Oct-03	Co-I	\$84,884
[21]	Bionetics Corporation	Hardware and Software Design to Integrate the PWONDER Flight Experiment in PGBA	Nov-00	Oct-01	PI	\$66,561
[22]	Space Hab, Inc.	Hardware Support and Integration of the STARS-2 Experiment	Jan-00	Sep-01	Co-I	\$219,964
[23]	Payload Systems	Thermal Design of the NASA Ames Cell Culture Unit (CCU)	Jan-00	Dec-00	Co-I	\$132,000
[24]	Space Hab, Inc.	Hardware Support and Integration of the STARS-1 Experiment	Jul-99	Jan-00	Co-I	\$69,969
[25]	BioSpace Inc.	BioSpace Protein Crystallization Experiment	Oct-98	Sep-99	Co-I	\$67,594
[26]	NASA HQ	BioServe Space Technologies - Cooperative Agreement NCC8-242	Nov-98	Oct-06	Co-I	\$17,860,000
[27]		Per-year (2000 - 2012; sans BioServe)				\$704,758
[28]		Per-year w/BioServe (with BioServe)				\$2,024,392

CU-BOULDER TLEN, CSCI AND EMEN COMPLETED COURSE SUMMARY

Semester	Course Title	Course #	Units	Grade	Points
	UCB Grad Courses				
Spring 1995	Topics in non-symbolic AI	CSCI 7222	3.0	A	12.0
Spring 2003	Network Systems	CSCI 5273	3.0	A	12.0
Fall 2003	Advanced Operating Systems	CSCI 5573	3.0	A	12.0
Fall 2003	Special Topics: Sensor Networking	CSCI 7143	3.0	A	12.0
Fall 2003	Computer Organization	ECEN 4593	3.0	A	12.0
Spring 2004	Distributed Systems	CSCI 5673	3.0	A	12.0
Spring 2004	Independent Study – Master’s Level	CSCI 5900	3.0	A	12.0
Fall 2004	Network Security	CSCI 6268	3.0	B	9.0
Spring 2005	Database Systems	CSCI 5817	3.0	A-	11.1
	UCB Telecommunications Grad Courses				
Fall 2005	Telecom Systems	TLEN 5310	3.0	A-	11.1
Spring 2006	Data Communications 1	TLEN 5330	3.0	A	12.0
Spring 2006	Wireless Communications	TLEN 5510	3.0	A-	11.1
Fall 2006	Wireless LANs	TLEN 5520	3.0	A	12.0
Spring 2007	Special Topics: Software Defined Radio	TLEN 5832	3.0	A	12.0
Summer 2008	Video Technology	TLEN 5380	3.0	A	12.0
	UCB Engineering Mgmt Grad Courses				
Fall 2007	Entrepreneurial Business Plan Prep	EMEN 5825	3.0	A	12.0
Fall 2008	Entrepreneurial Marketing	EMEN 5090	3.0	A	12.0
Spring 2009	Entrepreneurial Management	EMEN 5051	3.0	A	12.0
	UCB CSCI/ECEN Undergrad Courses				
Fall 2001	Data Structures	CSCI 2270	4.0	B+	13.2
Spring 2002	Operating Systems	CSCI 3753	4.0	A	16.0
Fall 2002	Software Engineering Methods	CSCI 3308	3.0	A	12.0
Fall 2002	Computers as Components	ECEN 2120	5.0	A-	18.5
Spring 2003	Algorithms	CSCI 3104	4.0	A	16.0
Spring 2003	Digital Logic	ECEN 3100	5.0	B	15.0
Fall 2015	HCI Big Data	CSCI 4830	3.0	A	12.0
	Colorado School of Mines Grad Courses				
Spring 1994	CSM: Engineering Scientific Computing	MACS 410	3.0	A	12.0
Fall 1994	CSM: Advanced Topics in AI	MACS 581	3.0	A	12.0
Spring 1995	CSM: Robotics and Computer Vision	MACS 574	3.0	A	12.0
Spring 1995	CSM: Graduate Robotics Research Seminar	MACS 691	1.0	A	4.0
Fall 1996	CSM: Evidential Reasoning in AI	MACS 581	3.0	A	12.0