KEVIN K. GIFFORD
Curriculum Vitae
kevin.gifford@colorado.edu

EDUCATION

UNIVERSITY OF COLORADO, BOULDER, CO
- **Ph.D., AEROSPACE ENGINEERING, 1997**; Cumulative GPA 3.83/4.00 for 139.0 credits.
- **M.S., AEROSPACE ENGINEERING, 1994.**

COLORADO SCHOOL OF MINES, GOLDEN, CO
- **B.S., CHEMICAL AND PETROLEUM REFINING ENGINEERING, 1983.**

PROFESSIONAL EXPERIENCE

2020 – PRESENT **RESEARCH PROFESSOR, COMPUTER SCIENCE**
2023 – PRESENT **FACULTY DIRECTOR, MS-CS ONLINE PROGRAM, COMPUTER SCIENCE**
UNIVERSITY OF COLORADO, BOULDER, CO

Jul 2019 – 2020 **RESEARCH PROFESSOR, TECHNOLOGY, CYBERSECURITY AND POLICY, TCP**
UNIVERSITY OF COLORADO, BOULDER, CO

2016 – Jun 2019 **SCHOLAR IN RESIDENCE, TECHNOLOGY, CYBERSECURITY AND POLICY, TCP**
UNIVERSITY OF COLORADO, BOULDER, CO

2004 – PRESENT **SENIOR RESEARCH ASSOCIATE, THEN D.C.S. GIFFORD, LLC**
Working Group Chairman of the Consultative Committee for Space Data Systems (CCSDS) Wireless Working Group (WWG)
UNIVERSITY OF COLORADO, BOULDER, CO, THEN D.C.S. GIFFORD, LLC

2008 – 2013 **SENIOR RESEARCH ASSOCIATE**, Project principal investigator (PI) for the NASA Disruption Tolerant Networking (DTN) Project.
UNIVERSITY OF COLORADO, BOULDER, CO

2004 – 2010 **SENIOR RESEARCH ASSOCIATE,** Project principal investigator (PI) for the BioNet middleware architecture used for NASA and space-agency low-latency information-sharing wireless networks
UNIVERSITY OF COLORADO, BOULDER, CO

1993 – 2004 **RESEARCH ASSOCIATE,** Lead Automation Engineer BioServe Space Technologies Research Center
UNIVERSITY OF COLORADO, BOULDER, CO

1990 – 1992 **CONSTRUCTION FOREMAN**, CORBIN CONSTRUCTION, LEADVILLE, CO
1984 – 1990 **SYSTEMS PROGRAMMER**, ARCO ALASKA, ANCHORAGE, AK
1983 – 1984 **GEOPHYSICAL ENGINEERING ASSISTANT**,
UNION OIL COMPANY OF CALIFORNIA, ALASKA, ANCHORAGE, AK

RESEARCH INTERESTS

Spectrum engineering, spectrum sharing, wireless communications, planetary surface networks, wireless communications for space exploration and public safety; online STEM DEI focus.

RESEARCH FUNDING

1. (2024-2026), PI: Curtis Watson (MITRE), Co-PI: Kevin Gifford (CU-Boulder), NSF SII-NRDZ: MITRE NRDZ-as-a-Service Field Deployment, Proposal #2431961, $9,615,000 [Awarded – Funds to CU-Boulder: $1,114,995].
2. (2024-2025), PI: Kevin Gifford, NASA NNX17AK79A, CY2025 Support of the CU Boulder Proximity Wireless Networking Testbed, $362,500.
3. (2024-2027), PI: Kevin Gifford, NSF New Spectrum: Spectrum Era 4 and Native Nations, Proposal #243048, $799,835, [Under Review].
4. (2023-2024), PI: Kevin Gifford, NASA NNX17AK79A, FY2023 Support of the CU Boulder Proximity Wireless Networking Testbed, $157,675.
5. (2023-2024), PI: Kevin Gifford, NSF SII-NRDZ DCL 23-065: Supplemental Funding Request: SII-NRDZ-SBE: Facilitating Collaboration with Native Nations in National Radio Dynamic Zones, $299,038.
6. (2022-2023), PI: Kevin Gifford, NSF SWIFT*, Passive and Active Spectrum Sharing,* DCL 22-095 Supplement, NSF Award # 2234284*,* $74,900.
7. (2022-2025), PI: Kevin Gifford, Co-PIs: David DeBoer, Elliot Eichen, Keith Gremban, Alex Pollack, NSF SII-NRDZ*, Radio Astronomy Dynamic Satellite Interference-Mitigation and Spectrum Sharing (RADYSIS),* NSF Award # 2232368*,* $1,999,985.
8. (2021-2023), PI: Kevin Gifford, Co-PIs: David DeBoer, Alex Pollack, Mark Lofquist, Wael Farah, *Hat Creek Radio Observatory – National Radio Dynamic Zone (HCRO-NRDZ),* NSF Award # 2139964*,* $1,446,437.
9. (2020-2023), PI: Kevin Gifford, Co-PIs: Keith Gremban, Tamara Lehman, NSF SWIFT*, Passive and Active Spectrum Sharing,* NSF Award # 2030233*,* $1,446,565.
10. (2017-2023), PI: Kevin Gifford, *Support of the NASA JSC-EV Exploration Wireless Communications (ExWC) Testbed*, Funding Agency: NASA JSC-EV, Total Award: $1,335,324.
11. (2018-2019), PI: Kevin Gifford, *IEEE 802.11ah Protocol Performance Evaluation*, Funding Agency: Trimble, Inc. Total Award: $220,383.
12. (2011-2013), PI: Kevin Gifford, *Support of the CCSDS Wireless Working Group*, Funding Agency: NASA JSC-EV, Total Award: $40,000.
13. (2012-2012), PI: Kevin Gifford, *Support of the NASA/ESA DTN OpsCom-1 ISS Activity*, Funding Agency: NASA HQ, Total Award: $124,998.
14. (2011-2011), PI: Kevin Gifford, *NASA Glenn Research Center Extra-Vehicular Radio Activity*, Funding Agency: NASA GRC, Total Award: $126,817.

15. (2010-2011), PI: Kevin Gifford, *NASA HQ ESA/JAXA ISS DTN Support*, Funding Agency: NASA HQ, Total Award: $255,000.

16. (2010-2013), PI: Kevin Gifford, *DTN Readiness Project - Phase 2*, Funding Agency: NASA HQ, Total Award: $2,939,995.

17. (2009-2010), PI: Kevin Gifford, *JAXA DTN Ground Test Activities*, Funding Agency: NASA HQ, Total Award: $50,000.

18. (2009-2012), PI: Kevin Gifford, *CU-Boulder support for the UN-Lincoln 2009 NASA EPSCOR Project*, Funding Agency: NASA EPSCOR w/ Univ. of Nebraska, Total Award: $100,000.

19. (2008-2009), PI: Kevin Gifford, *CCSDS Wireless Working Group & DTN Support for JSC Lunar Habitat Testbed*, Funding Agency: NASA JSC, Total Award: $149,906.

20. (2008-2011), PI: Kevin Gifford, *Inter-Center Space DTN Readiness Project*, Funding Agency: NASA HQ, Total Award: $2,940,985.

21. (2007-2008), PI: Kevin Gifford, *Lunar Habitat Wireless Testbed*, Funding Agency: NASA JSC, Total Award: $179,924.

22. (2007-2009), PI: Kevin Gifford, Co-I: Invocon, Inc., *Integrated Data Assimilation Architecture with Invocon, Inc. - Phase II*, Funding Agency: NASA GRC STTR, Total Award: $600,000.

23. (2006-2007), PI: Kevin Gifford, *Engineering support and representation for NASA JSC for the CCSDS data standards body*, Funding Agency: NASA JSC, Total Award: $89,236.

24. (2006-2007), PI: Kevin Gifford, *Wireless System Architecture (WSA)/BioNet Integrated Feasibility Assessment*, Funding Agency: NASA JSC, Total Award: $274,269.

25. (2006-2007), PI: Kevin Gifford, Co-I: Invocon, Inc. *Integrated Data Assimilation Architecture with Invocon, Inc. - Phase I*, Funding Agency: NASA GRC STTR, Total Award: $50,000.

26. (2006-2006), PI: Kevin Gifford, *BioNet, A Wireless Middleware Architecture: Commercial Market Research*, Funding Agency: CU-Boulder Technology Transfer Office proof-of-concept grant, Total Award: $25,000.

27. (2005-2005), PI: Kevin Gifford, *Wireless System Architecture (WSA) for Environmental & Physiological Monitoring*, Funding Agency: NASA JSC, Total Award: $100,000.

28. (2005-2005), PI: Kevin Gifford, *Integrated Data Assimilation Architecture for Advanced Physiological Monitoring*, Funding Agency: NASA MSFC, Total Award: $70,000.

29. (2003-2003), PI: Alexander Hoehn, Co-PI: Kevin Gifford, *Hardware and Software Design to Integrate the PTIM Space Flight Experiment in PGBA*, Funding Agency: Bionetics Corporation, Total Award: $84,884.

30. (2000-2001), PI: Alexander Hoehn, Co-PI: Kevin Gifford, *Hardware and Software Design to Integrate the PWONDER Flight Experiment in PGBA*, Funding Agency: Bionetics Corporation, Total Award: $66,561.

31. (2000-2001), PI: Alexander Hoehn, Co-PI: Kevin Gifford, *Hardware Support and Integration of the STARS-2 Experiment*, Funding Agency: SpaceHab, Inc., Total Award: $219,964.

32. (2000-2000), PI: Alexander Hoehn, Co-PI: Kevin Gifford, *Thermal Design of the NASA Ames Cell Culture Unit (CCU)*, Funding Agency: Payload Systems, Inc., Total Award: $132,000.

33. (1999-2000), PI: Alexander Hoehn, Co-PI: Kevin Gifford, *Hardware Support and Integration of the STARS-1 Experiment*, Funding Agency: SpaceHab, Inc., Total Award: $69,969.

34. (1998-1999), PI: Alexander Hoehn, Co-PI: Kevin Gifford, *BioSpace Protein Crystallization Experiment*, Funding Agency: BioSpace, Inc., Total Award: $67,594.

35. (1998-2006), PI: Louis Stodieck, Co-PI: Alexander Hoehn, Kevin Gifford, *BioServe Space Technologies - Cooperative Agreement NCC8-242*, Funding Agency: NASA, Total Award: $17,860,000.

Research Funding Per-year PI: 2005-2012, 2017-2022 (14 years): $1,045,695

Research Funding Per-year Co-I: 1998-2006 (9 years): $2,055,664

AWARDS AND HONORS

- *Nokia Bell Labs Research Gift*, SpaceComm Project Collaboration, $50,000, 2019.
- *Nokia Bell Labs Research Gift*, SpaceComm Project Collaboration, $50,000, 2018.
- *Best Senior Design Project in College of Engineering*, Autonomous Spin Stabilized Imaging System (ASSIS), Senior Design Project, Aerospace Senior Design Faculty Advisor, 2000.
- *Best Senior Design Project in College of Engineering*, Ratmobile (Robotic Autonomous Transport) Project, Senior Design Project, Aerospace Senior Design Faculty Co-Advisor, 1998.
- *Achievement Rewards for College Scientists* (ARCS) Scholarship (1996 and 1997).
- Led student robotics team that placed 1st at the *International Unmanned Ground Robotics Competition sponsored by the Association for Unmanned Vehicle Systems* in 1995. Other finishes include 3rd in 1994, 4th in 1996, 5th in 1997, 2nd in 1998.
- *American Institute of Mining and Engineering* (AIME) Undergraduate Scholarship (1978).

TEACHING EXPERIENCE

Year	Semester	Course #	Title	Credits	Students

2022	Spring	CYBR 6700	Graduate Projects II	3.0	11
2021	Fall	CYBR 5700	Graduate Projects I	3.0	11
2021	Spring	CYBR 6700	Graduate Projects II	3.0	15
2020	Fall	CYBR 5200	Introduction to Wireless Systems	3.0	5
2020	Fall	CYBR 5700	Graduate Projects I	3.0	15
2020	Spring	CYBR 6200	Advanced Wireless Lab	3.0	5
2020	Spring	CYBR 6700	Graduate Projects II	3.0	53
2019	Fall	CYBR 5200	Introduction to Wireless Systems	3.0	3
2019	Fall	CYBR 5700	Graduate Projects I	3.0	53
2019	Spring	TLEN 5830	Advanced Wireless Lab	3.0	8
2019	Spring	TLEN 5710	Graduate Projects II	3.0	52
2018	Fall	TLEN 5830	Introduction to Wireless Systems	3.0	13
2018	Fall	TLEN 5700	Graduate Projects I	3.0	53
2018	Spring	TLEN 5830	Advanced Wireless Lab	3.0	8
2018	Spring	TLEN 5710	Capstone Design	3.0	48
2017	Fall	TLEN 5830	Introduction to Wireless Systems	3.0	13
2017	Fall	TLEN 5700	Research Methods	3.0	53
2017	Spring	TLEN 5830	Advanced Wireless Lab	3.0	8
2016	Fall	TLEN 5830	Introduction to Wireless Systems	3.0	6
2016	Fall	TLEN 7001	Network Analysis Techniques	3.0	8
2001	Spring	ASEN 4519 ASEN 5519	Real-time data acquisition and hardware / software integration	3.0	14
2000	Spring	ASEN 4519 ASEN 5519	Real-time data acquisition and hardware / software integration	3.0	11

DEVELOPMENT OF NEW COURSES

- Development of the CU-Boulder Spectrum Engineering Graduate Certificate online offering via Coursera within the MS-EE program with the CU-Boulder College of Engineering Advanced Learning Initiative (CEAS ALI), 2022-2024.

- Performed comprehensive department curriculum assessment with the Directors of the Technology, Cybersecurity and Policy Program, Spring 2018. Goals included

curriculum and course normalization, modernization, and student course option flexibility.

- Restructured TLEN 5710 / CYBR 5710 Graduate Projects II – required capstone course focused on design engineering. Revised the syllabus, replaced all course lectures and slides. Initially taught in Spring 2018.
- Performed comprehensive wireless curriculum assessment and developed new hands-on labs for TLEN 5520 / CYBR 5220 WLANs and TLEN 5510 / CYBR 6210 Wireless and Cellular Communications for integrated wireless curriculum course offerings, Fall 2017.
- Restructured TLEN 5700 / CYBR 5700 Graduate Projects I – required capstone course focused on design engineering. Revised the syllabus, replaced all course lectures and slides. Initially taught in Fall 2017.
- Created TLEN 5830 / CYBR 5230 Advanced Wireless Lab, a graduate advanced topics class emphasizing hands-on wireless network communications and software defined radio (SDR), Spring 2017.
- Restructured TLEN 5830 / CYBR 5200 Introduction to Wireless Systems, a graduate introductory class to wireless network communications. Revised the syllabus, replaced all course lectures and slides. Initially taught in Fall 2016.
- Created TLEN 7001 Network Analysis Techniques, a required graduate course focusing on probability and statistics for network analysis, Fall 2016.
- Created ASEN 4519 / 5519 Real-time Data Acquisition and Hardware/Software Integration resulting from a year survey of aerospace engineering supervisors indicating that undergraduates with real-world hardware/software integration skills are highly sought after. Students with robotic design and integration experience are especially desirable for many of today's emerging automation-based industries. Spring 2000.

PROFESSIONAL SERVICE

- Faculty Director, CU-Boulder MS-CS online program, 2023 – Present.
- Ph.D. Program Chair, Technology, Cybersecurity and Policy Program, 2018 – Present.
- Graduate Projects Chair, Technology, Cybersecurity and Policy Program, 2018 – Present.
- Wireless Curriculum Chair, Technology, Cybersecurity and Policy Program, 2016 – Present.
- Director, Interdisciplinary Wireless Research Group, Technology, Cybersecurity and Policy Program then Computer Science, 2017 – Present.
- Wireless Working Group Chair, Consultative Committee on Space Data Systems (CCSDS), 2015 – Present.

- Member of the National Institute of Standards (NIST) Public Safety Communications Research (PSCR) Location Based Services (LBS) Working Group (August 2014 – January 2015).
- Served as NIST External Reviewer for final LBS report (available at http://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1883.pdf).
- Member of the National Institute of Standards (NIST) Public Safety Communications Research (PSCR) Data Analytics Working Group (May 2015 – Dec 2015).

LEADERSHIP SKILLS

- Improved professional research faculty morale and productivity with an improved management process based upon Agile methodologies.

- 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.

- 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 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 types of activities require two fundamental ethics in additional to trusted technical competency: fairness and consideration to lead differing constituencies to multi-stakeholder consensus.

- Contributions in space system communications with NASA to implement standards-based communication systems to improve data and science return of the International Space Station and exploration missions.

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 LEADERSHIP

1. Technical Program Committee, IEEE 2024 DySPAN, Field Trials for Advanced Spectrum Sharing (FAST), Washington, DC, May, 2024.
2. Technical Program Committee, Session Chair, IEEE 2024 DySPAN, Spectrum Coexistence in Passive Earth Observation and Radio Astronomy, Washington, DC, May, 2024.
3. Session Chair, IEEE 2024 DySPAN, Passive Users, Washington, DC, May, 2024.
4. Technical Chair, Consultative Committee Space Data Systems (CCSDS) 2007 Wireless Workshop, Colorado Springs, CO, January 22, 2007.

REFEREED PUBLICATIONS

1. Gifford, K.K., "Protecting RA observatories and Earth Observing Satellites from RFI", GNOSIS24 Virtual Conference, https://gnosisnetwork.org/gnosis-conference-2024/, [Invited Lightning Talk], Nov. 2024.

2. Llosa, S. P., Weihe, G., Forrester, C., and Gifford, K.K., "Improved Radio Astronomy Interference Characterization Using DevOps", *2025 NRSM-URSI,* Boulder, CO, USA, Sept. 2024. [Abstract accepted]

3. Llosa, S. P., Weihe, G., and Gifford, K.K., "Zero Trust Architecture for Radio Astronomy Research Organizations", *2025 NRSM-URSI,* Boulder, CO, USA, Sept. 2024. [Abstract accepted]

4. Aradhya, A.J., DeBoer, D.R., Gifford, K.K. et al, "An Experimental Test-bed for Investigating Spectrum Sharing Strategies Between Passive and Active Users at a Prototype National Radio Dynamic Zone (NRDZ)", *2025 NRSM-URSI,* Boulder, CO, USA, Sept. 2024. [Abstract accepted]

5. Llosa, S.P., Aradhya, A.J., and Gifford, K.K., "An Evaluation of a New Method of Calculating RFI with Kurtosis", *2024 IEEE RFI,* Bariloche, Argentina, Sept. 2024. [Contributing Author]

6. Gifford, K.K., *et al*., "Satellite Orbit Prediction Processor: Mitigating Satellite RFI to Radio Astronomy," *2024 IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, Washington, DC, USA, 2024, pp. 19-26, doi: 10.1109/DySPAN60163.2024.10632742. [Primary Author]

7. Gifford, K.K., DeBoer, D.R., Clegg, A., Gibson, M., "Satellite Orbit Prediction Processor: Mitigating Satellite RFI to Radio Astronomy", *2024 IEEE International Conference on Communications Workshops (ICC Workshops)*, Denver, CO, USA, 2024. [Primary Author]

8. Ruzindana, M., DeBoer, D., Pollak, A., Farah, W., Gifford, K.K., "*RFI Geolocation for Radio Interferometers using DOA Estimation Methods*", IEEE International Conference on Communications, June 2024 [Pending, Contributing author]

9. Sarbhai, A., Gifford, K.K. et al, "*Reactive Interference Management in a Radio Dynamic Zone*", IEEE DySPAN, May, 2024 [Pending, Contributing author], IEEE DySPAN, May 2024 [Accepted, Contributing author]

10. Edwards, E., Wagner, R., Zemba, M., Millard, W., Braham, S., Gifford, K.K., Somerlock, O., "*3GPP Mobile Telecommunications Technology on the Moon",* IEEE Aerospace, 2023. [Contributing author]

11. Almarshedi, W., Gifford, K.K., Weiss, M., "Techno-Economic Analysis of The Shared Virtualized Resources in 5G Small Cells Operating in Millimeter-Wave Spectrum Bands", Technology, Policy and Research Conference, TPRC51, Washington, DC, September, 2023, http://dx.doi.org/10.2139/ssrn.4528362 [Contributing author]

12. Tschimben, S., Aradhya, A., Weihe, G., Lofquist, M., Pollak, A., Farah, W., DeBoer, D., and Gifford, K.K., "*Testbed for Radio Astronomy Interference Characterization and Spectrum Sharing Research*", IEEE Wireless Communications and Networking Conference (IEEE WCNC), 2023. [Contributing author]

13. Papadopoulos, N., Lofquist, M., Clegg, A., Gifford, K.K., "*Spectrum Sharing Dynamic Protection Area Neighborhoods for Radio Astronomy*", IEEE Wireless Communications and Networking Conference (WCNC), March 2023. [Contributing author]

14. DeBoer, D., Gifford, K.K., Aradhya, A., Clegg, C., Farah, W., Lofquist, M., Pollak, A., Siemion, A., Tschimben, S., and Weihe, G., "*Spectrum Characterization and Sharing Activities at the Hat Creek Radio Observatory*", USNC-URSI National Radio Science Meeting (NRSM), January 2023, Boulder, CO USA. [Contributing author]

15. S. Llosa, G. Weihe, E. Morris, S. Tschimben, K. Gifford, T. Lehman, "*SecureRPi: A Comparison Study of Hardware and Software Security on IoT Devices*", Rocky Mountain AIAA, 2022. [Contributing author]

16. Tschimben, S., Gifford, K.K., "*Anomaly Detection with Autoencoders for Spectrum Sharing and Monitoring*", 2022 IEEE International Workshop Technical Committee on Communications Quality and Reliability (CQR), 2022, pp. 1-6. [Contributing author]

17. S. Subray, S., Tschimben, S. and Gifford, K.K., "*Towards Enhancing Spectrum Sensing: Signal Classification Using Autoencoders*", in *IEEE Access*, vol. 9, pp. 82288-82299, 2021, doi: 10.1109/ACCESS.2021.3087113. [Contributing author]

18. Tschimben, S., Subray, S., Gifford, K.K., "*Towards Enhancing Spectrum Sensing: Signal Classification Using Autoencoders*," in IEEE Access, vol. 9, pp. 82288-82299, 2021, doi: 10.1109/ACCESS.2021.3087113. [Contributing author]

19. Some, E., Gifford, K.K., "*Performance Evaluation of MIMO techniques with an SDR*", 2019 Gnu Radio Conference (GRCon2019), Huntsville, AL, September 2019. [Contributing author]

20. Tschimben, S., Gifford, K.K., Brown, R., "*IEEE 802.11ah SDR implementation and range performance evaluation*", 2019 IEEE Wireless Communications and Networking Conference, Marrakech, Morocco, April 2019. [Contributing author]

21. 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. [Primary author]

22. 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. [Primary author]

23. 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. [Primary author]

24. 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. [Contributing author]

25. 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. [Primary author]

26. Hoehn, A., and Gifford, K.K., et al, "Science Research and Education Modules for the CGBA Spaceflight Incubator", *SAE International Conference on Environmental Systems (ICES)*, Paper 2007-01-3188, Chicago, IL, July 2007. [Contributing author]

27. 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. [Contributing author]

28. 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. [Primary author]

29. Gifford, K.K., Kuzminsky, S., Williams, S., "An Integrated Architecture for Advanced Environmental and Physiological Monitoring*", SAE International Conference on Environmental Systems (ICES)*, Paper 2005-01-2874, Rome, Italy, July 2005. [Primary author]

30. Hoehn, A., Clawson, J., Freeman, J., Genova, J., Gifford, K.K., Stodieck, L., "Thermal Design of a Spaceflight Plant Chamber Payload", *32nd International Conference on Environmental Systems (ICES)*, SAE-paper 2003-01-2583, Vancouver, Canada, July 2003. [Contributing author]

31. Gifford, K.K., "A Modular Approach to Payload Communications and Control", *AIAA ISS Utilization Conference*, Cocoa Beach, FL, October 2001. [Primary author]

32. Hoehn, A., Forsman, A., Forsyth, S.W., Gifford, K.K., Heyenga, A.G., Sterrett, K.S., Scovazzo, P., and Stodieck, L., "Performance and Applicability to Advanced Life Support of the PGBA Plant Growth Facility", *3rd International Conference on Life Support and BioSpherics* (January 1998). *Published in Life Support and Biosphere Science, International Journal of Earth Space.* [Contributing author]

33. Hoehn, A., Forsman, A., Forsyth, S.W., Gifford, K.K., Heyenga, A.G., Sterrett, K.S., Scovazzo, P., and Stodieck, L., "Plant Life Support During 16 Days in Microgravity",

Annual Meeting, American Society of Gravitational and Space Biology. ASGSB Bulletin, vol.11 (1), 1997. [Contributing author]

34. Gifford, K.K., and Murphy, R.R., "Incorporating Uncertainties in Autonomous Vehicle Path Planning", *Intelligent Robotics and Systems, IEEE/IROS*, Osaka, Japan, 1996. [Primary author]

35. Hoehn, A., Chamberlain, D.J., Forsyth, S.W., Gifford, K.K., Hanna, D.S., Horner, M.B., Scovazzo, P., Smith, J., Stodieck, L.S., Todd, P.W., "Plant Generic Bioprocessing Apparatus: A Plant Growth Facility for Space Flight Biotechnology Research", *Sixth European Symposium on Life Sciences Research in Space*, Trondheim, Norway, 1996. [Contributing author]

36. Horner, M.B., Hoehn, A., Edwards, M.T., Gifford, K.K., Rupert, M.A., Knudsen, J.A., Ansicar, T.R., Stodieck, L.S., "Development of a Carbonated Beverage System for use in Space: Results of Ground-based and KC-135 Reduced Gravity Testing", *Sixth European Symposium on Life Sciences Research in Space*, Trondheim, Norway, 1996. [Contributing author]

37. Gifford, K.K., "Uncertainties in Autonomous Vehicle Path Planning", *Space and Robotics for Challenging Environments, ASCE*, Albuquerque, New Mexico, 1996. [Primary author]

38. Mackison, D.L., and Gifford, K.K., “ATTDES – An Expert System for Satellite Attitude Determination and Control”, *AAS/AIAA Space Flight Mechanics Meeting*, Austin, TX, February 1996. [Contributing author]

39. Gifford, K.K., and Morgenthaler, G.W., "Optimal Path Coverage Strategies for Planetary Rover Vehicles", *46th International Astronautical Congress*, Paper IAF-95-Q.1.07, Oslo, Norway, 1995. [Primary author]

40. Gifford, K.K., "RoboCar: Software, Hardware, and Mechanical Design Issues for the University of Colorado Autonomous Rover Vehicle", *SPIE conference (invited paper)*, Philadelphia, Pennsylvania, 1995. [Primary author]

41. Gifford, K.K., and Morgenthaler, G.W., "Efficient Path-Planning Strategies for Manned/Unmanned Vehicles", *Space and Robotics for Challenging Environments, ASCE*, Albuquerque, New Mexico, 1994. [Primary author]

42. Gifford, K.K., and Morgenthaler, G.W., "Minimum Energy Paths for the Martian Surface", *The Case for Mars V*, Boulder, Colorado, 1993. [Primary author]

INVITED PRESENTATIONS

1. McDonald, R., Gifford, K.K., Lane, J., Fullington, R., “Master of Science in Computer Science on Coursera – the MS-CS CU Boulder degree – A Deep Dive”, Affordable Degrees-at-Scale Symposium, Atlanta, GA, December, 2023.

2. Gifford, K.K. "Geospatial Sharing and Satellite Orbit Pre-Processing (S.O.P.P.)", NSF NRDZCOM3, November, 2023.

3. Eichen, E., and Gifford, K.K., “EESS Geofencing and RF Flshlight”, NSF NSDZCOM3, November, 2023.

4. Murtazashvili, I., Blackwater, D., Gifford, K.K., “Facilitating Collaboration with Native Nations”, NSF NRDZCOM3, November, 2023.

5. Gifford, K.K., Gremban, K., Tschimben, S., Lofquist, M., Eichen, E., Pearce, B., Papadopoulos, N., Aradhya, A., Llosa, S., Weihe, G., Collaco, O., Some, E., DeBoer, D., Farah, W., Pollak, A., Ruzindana, M., Forrester, C., Stover, B., "Spectrum Access System (SAS) for geospatial temporal frequency sharing via a Zone Management System (ZMS)", NSF NRDZCOM3, November, 2023.

6. Gifford, K.K., DeBoer, D., Farah, W., Lofquist, M., Tschimben, S., “Hat Creek Radio Observatory (HCRO) as a candidate NSF Field Test Site for the NSF SII-NRDZ Program”, NSF site visit to HCRO, September, 2023.

7. Gifford, K.K., Clegg, A. (Google, Winn Forum), "Spectrum Sharing for Radio Astronomy", Wireless Innovation Forum (WinnForum) annual meeting, Reston, VA, September, 2023.

8. Gifford, K.K., Gremban, K., Tschimben, S., Lofquist, M., Eichen, E., DeBoer, D., Farah, W., Pollak, A., "Hat Creek Radio Observatory NRDZ Field Trial Concept". NSF Spectrum Week, Alexandria, VA, NSF, April, 2023.

9. Gifford, K.K., Gremban, K., Tschimben, S., Lofquist, M., Savage, S. "CU-Boulder Spectrum Engineering Graduate Certificate – Spectrum Workforce Development (WFD)", NSF Spectrum Week, Alexandria, VA, NSF, April, 2023.

10. DeBoer, D., Gifford, K.K., Clegg, C., Pollack, A., Farah, W., Siemion, A., Weihe, G., Lofquist, M. Tschimben, S., "Spectrum sharing to improve Radio Astronomy scientific observations", NRSM URSI, 2023.

11. Gifford, K.K., DeBoer, D., Eichen, E., Clegg, A. “Radio Astronomy Dynamic Satellite Interference-Mitigation and Spectrum Sharing (RADYSIS)”, NRDZCOM1, NSF Spectrum Innovation Initiative, National Radio Dynamic Zones (SII-NRDZ), December 15, 2022.

12. Gifford, K.K., DeBoer, D., Clegg, A., Eichen, E., “Passive and Active Spectrum Sharing (PASS) to Protect Radio Astronomy and for Passive EOS Satellites”, Winn Comm 2022, Wireless Innovation Forum, December 14, 2022, https://conference.wirelessinnovation.org/winncomm-2022-virtual-program.

13. Gifford, K.K., DeBoer, D., Clegg, A., Pollak, A., Gremban, K. et al, “Hat Creek Radio Observatory National Radio Dynamic Zone Project Overview”, Project Updates on NSF-funded National Radio Dynamic Zones Investigations, NSF Workshop, March 23, 2022, https://players.brightcove.net/pages/v1/index.html?accountId=6792561330001&playerId=default&videoId=6301833423001&autoplay=true&t=241s.

14. Clegg, A., and Gifford, K.K., “Protection of Passive Services in Radio Spectrum”, Winn Comm 2021, Wireless Innovation Forum, December 1, 2021, https://conference.wirelessinnovation.org/2021-extended-program.

15. Gifford, K.K. and Cerf, V., “Open-source DTN communication software for ISS payloads”, NASA Johnson Space Center and Boeing. Houston TX, June 2013.

16. Gifford, K.K, Wright, J., Doraisingam, S. “Open-source DTN communication software for ISS Payloads”, *NASA Payloads Operations and Integration Working Group*, Huntsville, AL, July 2013.

17. Gifford, K.K., “Why Middleware is an important systemic problem for NASA to overcome”, NASA Johnson Space Center, Houston, TX, June 2013.

18. Gifford, K.K., “Utilizing the ISS as a DTN Technology Demonstration Platform”, *IEEE GlobeComm 2012 Guest Panelist*, Anaheim, CA, December 2012.

19. Gifford, K.K., Williams, S.P, and Pitts, R.L., “Using the ISS as a Technology Demonstration Platform to verify operational utilization of Disruption Tolerant Networking”, *1st Annual ISS Research and Development Conference*, Denver, CO, June 2012.

20. Gifford, K.K., “DTN Overview for Space Communications and Tele-robotics”, *Technical University at Munich*, Munich, Germany, April 2012.

21. Gifford, K.K., “Disruption Tolerant Networking”, *IEEE New Technologies Conference (NTC)*, Seal Beach, CA, August 2011.

22. Gifford, K.K. and Foore, L., “BioNet Command, Control, and Communications Infrastructure for NASA’s Exploration Mission”, IEEE RFID World Conference, CANEUS Workshop, Grapevine, TX, March 2007.

23. Gifford, K.K., “Wireless Communications and Standards Activities in Support of NASA’s Exploration Mission”, IEEE RFID World Conference, IEEE RFID Panel Discussion, Grapevine, TX, March 2007.

24. Gifford, K.K., Kuzminsky, S., Williams, S., and Saiz, J., “BioNet: An Enabling Architecture for Advanced Heterogeneous Wireless Applications”, *ESA/ESTEC Wireless for Space Applications Workshop*, Noordwijk, The Netherlands, July 2006.

25. Gifford, K.K., Johnson-Thorpe, K., and Stanch, P., “A Wireless Medical Informatics System Architecture (MISA) for Extended Duration Space Exploration”, *ESA/ESTEC Wireless for Space Applications Workshop*, Noordwijk, The Netherlands, July 2006.

26. 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.

27. Plancke, P., Saiz, J., Hernandez-Velasco, I., Gifford, K.K., and Carron, C., “Wireless Communications and Interfaces Onboard Spacecraft”, *ESA/ESTEC Wireless for Space Applications Workshop*, Noordwijk, The Netherlands, July 2006.

28. Gifford, K.K., and Saiz, J., “BioNet: A Standards-Based Architecture for Crew Health and Environment Data”, *NASA JSC Invited Presentation*, Houston, TX, October 2005.

29. Gifford, K.K., and Saiz, J., “Wireless System Architecture for End-Users and Application Developers”, *Consultative Committee for Space Data Systems (CCSDS) Conference Invited Presentation*, Athens, Greece, April 2005.

30. Gifford, K.K., and Saiz, J., “A Candidate System Architecture for Heterogeneous Wireless Instrumentation”, *Consultative Committee for Space Data Systems (CCSDS) Conference Invited Presentation*, Toulouse, France November 2004.

31. Gifford, K.K., "International Space Station Remote Operations Panel", *AIAA ISS Utilization Conference Invited Presentation*, Cocoa Beach, FL, October 2001.

SCHOLARLY PROFESSIONAL PUBLICATIONS

1. *Spacecraft Onboard Interface Services--High Data Rate Wireless Proximity Network Communications*, Blue Book. Issue 1, February, 2022. **CCSDS-883-B-1**. Primary Author.

2. *Wireless Network Communications Overview for Space Mission Operations*. Green Book. Issue 3. May 2017. **CCSDS 880.0-G-3**. Primary Author, in the top-10 CCSDS standards document downloads for 10+ years dating back to original Issue 1.

3. *Spacecraft Onboard Interface Services--RFID-Based Inventory Management Systems.* Magenta Book. Issue 1. May 2012. **CCSDS 881.0-M-1**. Primary Author.

4. *Spacecraft Onboard Interface Services--RFID.* Blue Book. Issue 1. October 2017. **CCSDS 881.1-B-1**. Primary Author.

5. *Spacecraft Onboard Interface Systems--Low Data-Rate Wireless Communications for Spacecraft Monitoring and Control.* Magenta Book. Issue 1. May 2013. **CCSDS 882.0-M-1**. Primary Author.

6. *Spacecraft Onboard Interface Systems--Wireless Proximity Network Communications.* Experimental Specification. Issue 0 Draft. May 2019. **CCSDS 883.0-O-0**. Primary Author.

MENTORED UNDERGRADUATE AND GRADUATE STUDENTS

STUDENT	DATES	STUDENT MENTORING PROJECTS
Dustin Hooks	2024 – Present	Ph.D. Graduate Student focusing on online STEM DEI
Calvin Henggeler	2024 – Present	M.S. Thesis Advisor

Arvind Aradyha	2021 – Present	Ph.D. Graduate student, Ph.D. Advisor
Sylvia Llosa	2021 – Present	Ph.D. Graduate student, Ph.D. Advisor
Nick Papadopoulos	2021 – Present	Ph.D. Graduate student, Ph.D. Advisor
Eloise Morris	2020 – 2024	M.S. / GRA student
Georgiana Weihe	2021 – 2024	M.S. / GRA student
Percy Suchanek Heidi Kreig	2022 – 2023	WIRG Research Group website development
Fan Shen	2021 – 2023	Ph.D. Graduate student, Ph.D. Committee Member
Jordan O'Dell	2021 – 2023	Graduate researcher on 5G-USA open source LTE/5G
Sirak Zewdie	2021 – 2023	Graduate researcher on 5G-USA open source LTE/5G
Mark Lofquist	2018 – 2019	Ph.D. Graduate student, Ph.D. Advisor
Stefan Tschimben	2018 – 2022	Ph.D. Graduate student, Ph.D. Advisor
Siddhartha Subray	2017 – 2022	Ph.D. Graduate student, Ph.D. Advisor
Evariste Some	2018 – 2023	Ph.D. Graduate student, Ph.D. Advisor
Irena Stevens	2019 – 2021	Ph.D. Graduate student, Ph.D. Advisor
Waleed Almarshedi	2019 – Present	Ph.D. Graduate student, Ph.D. Advisor
Andre Rosete	2018 – 2021	Ph.D. Graduate student, Ph.D. Committee Member
Dewang Gedia	2018 – 2021	Ph.D. Graduate student, Ph.D. Committee Member
Donald Harris, Ryan Bohannon Scott Ledgerwood Joshua Anderson Curtiss Alexander Abdullah Almujalli Ehsan Karmini	2018 – 2019	Spacecraft Cybersecurity threat detection & testbed design (Graduate Projects Academic Advisor)
Vaibhav Dhondji Ankita Khedekar Akhilesh Khedekar Abhishek Varkhedi	2018 – 2019	Software Defined Radio (SDR) RF Spectrum Sensing (Graduate Projects Academic Advisor)
Alex Vetras Cheffren Canady Sampreet Kishan Andres Chapiro Fermon	2018 – 2019	Internet-of-Things (IoT) Device Classification (Graduate Projects Academic Advisor)
Aditya Ahuja Schweta Kondvilker Rishabh Hastu Akhil Kadali Vibhav Kurtarkar	2017 – 2018	SDN/NFV for Public Safety: Deployables, Automation, Analytics (Graduate Projects Academic Advisor)
Siddhartha Subray Vijay Sarangarajan Shruthi Prasad	2017 – 2018	NASA Wireless Space Communications Testbed (Graduate Projects Academic Advisor)
Anisha Teckchandani Priyanka Balraj Shivraj Barik Vidhi Raval	2016 – 2017	Deployment of Software Defined Radio in Space (Graduate Projects Academic Advisor)

Abhishek Prakash Pallavi Akella Pritish Sachdeva Sanjana Annapureddy	2016 – 2017	Advancing Communications using Disruption Tolerant Networks (Graduate Projects Academic Advisor)
Meghana Iyer Prajwal Badhey Shruti Kawle Sriram Krishnaswamy	2016 – 2017	Planetary Surface Communication Architecture (Graduate Projects Academic Advisor)
Gaurav Diwate Kunal Aniruddha Parth Shah Sree Vinay Natarajan	2016 – 2017	Wi-Gig Communication System for NASA Mission Support (Graduate Projects Academic Advisor)
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
STUDENT	**DATES**	**STUDENT MENTORING PROJECTS**
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)