

Allen H. Goldstein - Curriculum Vita

MacArthur Foundation Chair and Distinguished Professor

University of California, Berkeley (UCB)

Department of Environmental Science, Policy and Management (ESPM)

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Professional Experience

Associate Dean for Academic Affairs, Rausser College of Natural Resources, UCB	2020-present
Distinguished Professor, Department of ESPM, UCB	2019-present
Distinguished Professor, Department of Civil and Environmental Engineering, UCB	2019-present
Professor, Department of ESPM, UCB	2005-2019
Professor, Department of Civil and Environmental Engineering, UCB	2008-2019
Visiting Professor, Max Planck Institute for Chemistry, Germany	2019
Visiting Professor, Hong Kong Polytechnic Institute, Hong Kong	2018-2019
Visiting Professor, Institute of Atmos. Sciences and Climate (CNR-ISAC), Italy	2018
Chair, Department of Environmental Science, Policy, and Management, UCB	2007-2010
Visiting Professor, Royal Melbourne Institute of Technology, Australia	2005-2006
Visiting Professor, CSIRO Marine and Atmospheric Research, Australia	2005-2006
Associate Professor of Biogeochemistry, University of California at Berkeley	2001-2005
Assistant Professor of Biogeochemistry, University of California at Berkeley	1996-2001
Faculty Chemist, Lawrence Berkeley National Laboratory	1996-present
Harvard Division of Applied Sciences Post-Doctoral Fellow	1994-1995
National Oceanographic and Atmospheric Administration Visiting Scientist	1994

Education

PhD	Chemistry	Harvard University	1994
MA	Chemistry	Harvard University	1991
BS	Chemistry	University of California at Santa Cruz	1989
BA	Politics	University of California at Santa Cruz	1989

Honors and Awards

Miller Research Professor, UCB	2024-2025
Carol D. Soc Distinguished Graduate Student Mentoring Award, UCB	2024
Haagen-Smit Clean Air Award, Science and Technology, California Air Resources Board	2022
Award for Creative Advances in Environmental Science and Technology, American Chemical Society (ACS)	2021
Elected Fellow, American Association for Aerosol Research (AAAR)	2020
John D. and Catherine T. MacArthur Foundation Chair (Endowed Chair, UCB)	2019-2024
Yoram J. Kaufman Outstanding Research and Unselfish Cooperation Award, American Geophysical Union (AGU)	2019
Elected Fellow, American Association for the Advancement of Science (AAAS)	2018
David Sinclair Award, American Association for Aerosol Research (AAAR)	2018
Fulbright Scholar (Italy)	2018
Alexander Von Humboldt Research Award (Humboldt Prize)	2017
Highly Cited Researcher, Clarivate Analytics (5 years)	2017-2021

Camille and Henry Dreyfus Environmental Chemistry Mentor Award	2012
AEESP Plenary Lecturer, American Association for Aerosol Research	2012
Norbert Gerbier-MUMM International Award	2012 & 2004
Elected Fellow, American Geophysical Union (AGU)	2011
Miller Research Professor UC Berkeley	2010-2011
Fulbright Senior Scholar (Australia)	2005
Senator Harry E. Drobish Award for innovative educational activities	2004
Award for Extensive University Service	1999-2000
Hellman Foundation Junior Faculty Award for Excellence in Research	1997
Graduate Fellowship for Global Climate Change Studies (DOE)	1991-1994
Highest Honors in Chemistry – UC Santa Cruz	1989

Research Program: Atmospheric chemistry of gases and aerosols, air pollution, biosphere-atmosphere exchange of radiatively and chemically active trace species, and development and application of novel instrumentation to investigate the organic chemistry of earth's atmosphere. Field campaigns, controlled laboratory experiments, and modeling activities covering indoor, outdoor urban, rural, regional, intercontinental, and global scale studies of ozone, aerosols, and their gas phase precursors. Comprehensive research questions include: *What controls atmospheric concentrations of greenhouse gases, volatile organic compounds, photochemical oxidants, and aerosols? How do biological systems interact chemically and physically with earth's atmosphere?*

Working Groups & Advisory Committees (selected examples)

International Advisory Board, Research Institute for Land and Space (RILS), Hong Kong Polytechnic University	2022-present
Advisory Board, Atmosphere and Climate Competence Center (ACCC) Science and Impact, Helsinki, Finland	2020-present
Co-author of National Academies Report "Why Indoor Chemistry Matters"	2022
National Academy of Sciences Committee, Emerging Science on Indoor Chemistry	2020-2022
Advisory Committee, Max Planck Institute for Chemistry, Indoor Chemical Human Emissions and Reactivity (ICHEAR) project	2019-2022
Advisory Committee, Hong Kong Polytechnic University, Photochemical Air Pollution in Highly Urbanized Subtropical Regions project	2018-2023
External Review Committee, UC Irvine School of Physical Sciences	2017
Board of Directors American Association of Aerosol Research	2016-2019
Co-author of National Academies Report "The Future of Atmospheric Chemistry Research"	2016
National Academy of Sciences Committee, Future of Atmospheric Chemistry Research	2014-2016
Co-Chair International Global Atmospheric Chemistry (IGAC) Project	2013-2016
IGAC Scientific Steering Committee	2009-2016
LBNL/DOE Executive Committee for International Conference on Carbonaceous Particles in the Atmosphere	2015
DOE/PNNL Environmental Molecular Sciences Laboratory Atmospheric Aerosol Science Advisory Panel	2014
External Review Committee UC Davis Air Quality Research Center	2014

Scientific Program Committee, Co-Lead Investigator Southern Oxidant and Aerosol Study (SOAS)	2013
Chair IGAC 2012 Open Science Conference, Beijing, China	2012
Co-Lead Scientist Bakersfield Supersite for CALNEX	2011
Co-Lead Scientist, initiator, and organizer (with R. Cohen) Biosphere Effects on Aerosols and Photochemistry Experiment (BEARPEX)	2007-2009
Blodgett Forest AmeriFlux site initiator and scientific lead investigator	1997-2009
NOAA ITCT 2K4 Science Team Leader for Ground Site, Chebogue Pt	2004
NOAA ITCT 2K2 Science Team Leader for Ground Site, Trinidad Head	2002
NEON – NSF Program Planning Committee	2002
FLUXNET Flux Synthesis Committee and Science Team	2000
NIGEC Planning Workshop Effects of Air Pollution on Ecosystems	2000
Carbon Management Working Group (Department of Energy, LBNL)	1998

Professional Societies

Fellow, American Geophysical Union (AGU)
Fellow, American Association for the Advancement of Science (AAAS)
Fellow, American Association of Aerosol Research (AAAR)
Member, American Chemical Society (ACS)
Member, International Society of Indoor Air Quality and Climate (ISIAQ)
Member, Sigma Xi, Scientific Research Honor Society

Editorial Activities

Editorial Advisory Board, Environmental Science & Technology Air (ACS)	2023-present
Editorial Advisory Board, Environmental Science & Technology (ACS)	2017-2023
Associate Editor, Elementa	2016-present
American Association for Aerosol Research Publications Committee	2011-2014
Editor, Atmospheric Chemistry and Physics, Special Issue “Summertime boreal forest atmospheric chemistry and physics” (HUMPPA-COPEC)	2010
Editor, Atmospheric Chemistry and Physics, Special Issue “Amazonian Aerosol Characterization Experiment (AMAZE-08)	2008
Associate Editor for Journal of Geophysical Research - Biogeosciences	2004-08
Editor for Biogeosciences (EGU)	2003-07
Associate Editor for Ecological Applications (ESA)	2002-2005

Publications

Google Scholar Citation statistics: h-index 117, i10-index 392, citations ~ 57,760

#current or former member of Goldstein Group at UC Berkeley

423. #Pfannerstill, E.Y., #C. Arata, Q. Zhu, B.C. Schulze, R. Ward, R. Woods, C. Harkins, R.H. Schwantes, J.H. Seinfeld, A. Bucholtz, R.C. Cohen, and A.H. Goldstein, Temperature-dependent emissions dominate aerosol and ozone formation in Los Angeles, *Science*, 384, 6702, 1324-1329, <https://www.science.org/doi/10.1126/science.adg8204>, 2024.
422. Farmer, D.K., M.E. Vance, D. Poppendieck, J. Abbatt, #M.R. Alves, K.C. Dannemiller, C. Deeleepojananan, J. Ditto, B. Dougherty, O.R. Farinas, A.H. Goldstein, V.H. Grassian, H. Huynh, D. Kim, J.C. King, J. Kroll, J. Li, M.F. Link, L. Mael, K. Mayer, A.B. Martin, G. Morrison, R. O'Brien, S. Pandit, B.J. Turpin, M. Webb, J. Yu, S.M. Zimmerman, The chemical assessment of surfaces and air (CASA) study: using chemical and physical perturbations in a test house to investigate indoor processes, *Environ. Sci.: Processes Impacts*, doi:10.1039/d4em00209a, Advance Article, 2024.
421. Zhu, Q., R.H. Schwantes, M. Coggon, C. Harkins, J. Schnell, J. He, H.O.T. Pye, M. Li, B. Baker, Z. Moon, R. Ahmadov, #E.Y. Pfannerstill, B. Place, P. Wooldridge, B.C. Schulze, #C. Arata, A. Bucholtz, J.H., Seinfeld, C. Warneke, C.E. Stockwell, L. Xu, K. Zuraski, M.A. Robinson, A. Neuman, P.R. Veres, J. Peischl, S.S. Brown, A.H. Goldstein, R.C. Cohen, and B.C. McDonald, A better representation of volatile organic compound chemistry in WRF-Chem and its impact on ozone over Los Angeles, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-24-5265-2024>, 24, 5265–5286, 2024.
420. #Molinier, B., #C. Arata, #D.M. Lunderberg, B.C. Singer, W.W. Nazaroff, and A.H. Goldstein, Volatile Organic Compound Composition and Emissions in a Residential Attic, *Environ. Sci. Technol. Air*, <https://doi.org/10.1021/acsestair.4c00040>, Article ASAP, 2024.
419. #Molinier, B., #C. Arata, #E.F. Katz, #D.M. Lunderberg, #J. Ofodile, B.C. Singer, W.W. Nazaroff, A.H. Goldstein, Bedroom Concentrations and Emissions of Volatile Organic Compounds during Sleep, *Environ. Sci. Technol.*, <https://doi.org/10.1021/acs.est.3c10841>, Article ASAP, 2024.
418. #Ofodile, J., #M.R. Alves, #Y. Liang, #E.B. Franklin, #D.M. Lunderberg, C.E. Ivey, B.C. Singer, W.W. Nazaroff, and A.H. Goldstein, Characterizing PM_{2.5} Emissions and Temporal Evolution of Organic Composition from Incense Burning in a California Residence, *Environ. Sci. Technol.*, 58, 11, 5047–5057, <https://doi.org/10.1021/acs.est.3c08904>, 2024.
417. Nassikas, N.J., M.C. McCormack, G. Ewart, J.R. Balmes, T.C. Bond, E. Brigham, K. Cromar, A.H. Goldstein, A. Hicks, P.K. Hopke, B. Meyer, W.W. Nazaroff, L.M. Paulin, M.B. Rice, G.D. Thurston, B.J. Turpin, M.E. Vance, C.J. Weschler, J. Zhang, and H.M. Kipen, Indoor Air Sources of Outdoor Air Pollution: Health Consequences, Policy, and Recommendations: An Official American Thoracic Society Workshop Report, *Ann. Am. Thorac. Soc.*, 21, 3, 365–376, 2024.
416. Coggon, M.M., C.E. Stockwell, M.S. Claflin, #E.Y. Pfannerstill, X. Lu, J.B. Gilman, J. Marcantonio, C. Cao, K. Bates, G.I. Gkatzelis, A. Lamplugh, E.F. Katz, C. Arata, E.C. Apel, R.S. Hornbrook, F. Piel, F. Majluf, D.R. Blake, A. Wisthaler, M. Canagaratna, B.M. Lerner, A.H. Goldstein, J.E. Mak, and C. Warneke, Identifying and correcting interferences to PTR-ToF-MS measurements of isoprene and other urban volatile organic compounds, *Atmos. Meas. Tech.*, 17, 801–825, <https://doi.org/10.5194/amt-17-801-2024>, 2024.
415. #Lunderberg, D.M., #Y. Liang, B.C. Singer, J.S. Apte, W.W. Nazaroff, and A.H. Goldstein, Assessing residential PM_{2.5} concentrations and infiltration factors with high spatiotemporal resolution using crowdsourced sensors, *Proceedings of the National Academy of Sciences*, 120 (50) e2308832120, 2023.
414. Goldstein, A.H., K.C. Barsanti, J.J. Battles, S.L. Stevens, R.A. York, T. Kirchstetter, N.M. Kreisberg, #D. Sengupta, #Y. Liang, D. Foster, J. Butler, A. Tasnia, G. Lara, P. Van Rooy, Understanding and Mitigating Wildfire Risk in California, Final Report, California Air Resources Board Award No. 19RD008, 2023.

413. Schulze, B.C., R.X. Ward, #E.Y. Pfannerstill, Q. Zhu, #C. Arata, B. Place, C. Nussbaumer, P. Wooldridge, R. Woods, A. Bucholtz, R.C. Cohen, A.H. Goldstein, P.O. Wennberg, and J.H. Seinfeld, Methane Emissions from Dairy Operations in California's San Joaquin Valley Evaluated Using Airborne Flux Measurements, *Environ. Sci. Technol.*, <https://doi.org/10.1021/acs.est.3c03940>, 57, 48, 19519–19531, 2023.
412. #Pfannerstill, E.Y., #C. Arata, Q. Zhu, B.C. Schulze, R. Woods, C. Harkins, R.H. Schwantes, B.C. McDonald, J.H. Seinfeld, A. Bucholtz, R.C. Cohen, and A.H. Goldstein, Comparison between Spatially Resolved Airborne Flux Measurements and Emission Inventories of Volatile Organic Compounds in Los Angeles, *Environ. Sci. Technol.*, <https://doi.org/10.1021/acs.est.3c03162>, 57, 41, 15533–15545, 2023.
411. Goldstein, A.H., R. Cohen, A. Bucholtz, #E. Pfannerstill, #C. Arata, Q. Zhu, C. Nussbaumer, Airborne flux measurements of volatile organic compounds and oxides of nitrogen in California, Final Report, California Air Resources Board Award No. 20RD003 and 20AQP012, 2023.
410. Lyu, X., K. Li, H. Guo, L. Morawska, B. Zhou, Y. Zeren, F. Jiang, C. Chen, A.H. Goldstein, X. Xu, T. Wang, X. Lu, T. Zhu, X. Querol, S. Chatani, M.T. Latif, D. Schuch, V. Sinha, P. Kumar, B. Mullins, R. Seguel, M. Shao, L. Xue, N. Wang, J. Chen, J. Gao, F. Chai, I. Simpson, B. Sinha, D.R. Blake, Mitigating global tropospheric ozone threat through a synergistic control with climate, *One Earth*, 6, 8, 964-977, 2023.
409. Shetty, N., P. Liu, #Y. Liang, B. Sumlin, C. Daube, S. Herndon, A.H. Goldstein, R.K. Chakrabarty, Brown carbon absorptivity in fresh wildfire smoke: associations with volatility and chemical compound groups, *Environ. Sci.: Atmos.*, 3, 1262-1271, DOI: 10.1039/d3ea00067b, 2023.
408. #Liang, Y., #R.A. Wernis, #K Kristensen, N.M. Kreisberg, P.L. Croteau, S.C. Herndon, #A.W.H. Chan, N.L. Ng, A.H. Goldstein, Gas-Particle Partitioning of Semivolatile Organic Compounds When Wildfire Smoke Comes to Town, *Atmos. Chem. Phys.*, 23, 12441–12454, <https://doi.org/10.5194/acp-23-12441-2023>, 2023.
407. Zhang, J., J. Liu, X. Ding, X. He, T. Zhang, M. Zheng, M. Choi, #G. Isaacman-VanWertz, #L. Yee, #H. Zhang, #P. Misztal, A.H. Goldstein, A.B. Guenther, S.H. Budisulistiorini, J.D. Surratt, E.A. Stone, M. Shrivastava, D. Wu, J.Z. Yu, and Q. Ying, New formation and fate of Isoprene SOA markers revealed by field data-constrained modeling, *npj Clim. Atmos. Sci.*, 6, 69, 394-3, <https://doi.org/10.1038/s41612-023-00>, 2023.
406. Goldstein, A.H., R. Cohen, A. Bucholtz, #E. Pfannerstill, #C. Arata, Q. Zhu, C. Nussbaumer, Airborne flux measurements of volatile organic compounds and oxides of nitrogen in California, California Air Resources Board Award No. 20RD003 and 20AQP012, June 13, 2023.
405. #Pfannerstill, E.Y., #C. Arata, Q. Zhu, B.C. Schulze, R. Woods, J.H. Seinfeld, A. Bucholtz, A., R.C. Cohen, and A.H. Goldstein, Volatile organic compound fluxes in the San Joaquin Valley – spatial distribution, source attribution, and inventory comparison, *Atmos. Chem. Phys.*, 23, 12753–12780, <https://doi.org/10.5194/acp-23-12753-2023>, 2023.
404. Nussbaumer, C. M., B.K. Place, Q. Zhu, #E.Y. Pfannerstill, P. Wooldridge, B.C. Schulze, #C. Arata, R. Ward, A. Bucholtz, J.H. Seinfeld, A.H. Goldstein, and R.C. Cohen, Measurement report: Airborne measurements of NOx fluxes over Los Angeles during the RECAP-CA 2021 campaign, *Atmos. Chem. Phys.*, 23, 13015–13028, <https://doi.org/10.5194/acp-23-13015-2023>, 2023.
403. #Franklin, E.B., #L.D. Yee, #R. Wernis, #G. Isaacman-VanWertz, N. Kreisberg, #R. Weber, #H. Zhang, B.B. Palm, W. Hu, P. Campuzano-Jost, D.A. Day, A. Manzi, P. Artaxo, R.A.F. Souza, J.L. Jimenez, S.T. Martin, A.H. Goldstein, Chemical Signatures of Seasonally Unique Anthropogenic Influences on Organic Aerosol Composition in the Central Amazon, *Environ. Sci. Technol.*, <https://pubs.acs.org/doi/pdf/10.1021/acs.est.2c07260>, 57, 15, 6263–6272, 2023.

402. Zhu, Q., B. Place, #E.Y. Pfannerstill, S. Tong, H. Zhang, J. Wang, C.M. Nussbaumer, P. Wooldridge, B.C. Schulze, #C. Arata, A. Bucholtz, J.H. Seinfeld, A.H. Goldstein, and R.C. Cohen, Direct observations of NO_x emissions over the San Joaquin Valley using airborne flux measurements during RECAP-CA 2021 field campaign, *Atmos. Chem. Phys.*, 23, 9669–9683, <https://doi.org/10.5194/acp-23-9669-2023>, 2023.
401. #Kristensen, K., #D.M. Lunderberg, #Y. Liu, P.K. #Miszta, #Y. Tian, #C. Arata, W.W. Nazaroff, A.H. Goldstein, Gas-Particle Partitioning of Semivolatile Organic Compounds in a Residence: Influence of Particles from Candles, Cooking, and Outdoors, *Env. Sci. Technol.*, doi.org/10.1021/acs.est.2c07172, 57, 8, 3260–3269, 2023.
400. Reidy, E., B.P. Bottorff, C. Marciel, F. Rosales, F.J. Cardoso-Saldaña, #C. Arata, S. Zhou, C. Wang, A. Abeleira, L. Hildebrandt Ruiz, A.H. Goldstein, A. Novoselac, T.F. Kahan, J.P.D. Abbatt, M.E. Vance, D.K. Farmer, and P.S. Stevens, Measurements of Hydroxyl Radical Concentrations during Indoor Cooking Events: Evidence of an Unmeasured Photolytic Source of Radicals, *Env. Sci. Technol.*, doi.org/10.1021/acs.est.2c05756, 2023.
399. Lakey, P., A. Zuend, G.C. Morrison, T. Berkemeier, J. Willson, #C. Arata, A.H. Goldstein, K.R. Wilson, N. Wang, J. Williams, J.P.D. Abbatt, M. Shiraiwa, Quantifying the impact of relative humidity on human exposure to gas phase squalene ozonolysis products, *Environ. Sci.: Atmos.*, doi.org/10.1039/D2EA00112H, 3, 49-64, 2023.
398. #Franklin, E.B., S. Amiri, D. Crocker, C. Morris, K. Mayer, J.S. Sauer, R.J. Weber, C. Lee, F. Malfatti, C.D. Cappa, T.H. Bertram, K.A. Prather, and A.H. Goldstein, Anthropogenic and Biogenic Contributions to the Organic Composition of Coastal Submicron Sea Spray Aerosol, *Environ. Sci. Technol.*, 56, 23, 16633–16642, doi.org/10.1021/acs.est.2c04848, 2022.
397. #Molinier, B., #C. Arata, #E.F. Katz, #D.M. Lunderberg, #Y. Liu, #P.K. Misztal, W.W. Nazaroff, A.H. Goldstein, Volatile Methyl Siloxanes and Other Organosilicon Compounds in Residential Air, *Environ. Sci. Technol.*, <https://doi.org/10.1021/acs.est.2c05438>, 56, 22, 15427–15436, 2022.
396. #Wernis, R.A., N.M. Kreisberg, #R.J. Weber, #G.T. Drozd, and A.H. Goldstein, Source Apportionment of VOCs, IVOCs, and SVOCs by Positive Matrix Factorization in Suburban Livermore, California, *Atmos. Chem. Phys.*, 22, 14987–15019, doi.org/10.5194/acp-22-14987-2022, 2022.
395. #Liang, Y., C. Stamatidis, E.C. Fortner, #R.A. Wernis, P. Van Rooy, F. Majluf, T.I. Yacovitch, C. Daube, S.C. Herndon, N.M. Kreisberg, K.C. Barsanti, and A.H. Goldstein, Emissions of organic compounds from western US wildfires and their near-fire transformations, *Atmos. Chem. Phys.*, 22, 9877–9893, doi.org/10.5194/acp-22-9877-2022, 2022.
394. Hodshire, A.L., E. Carter, J.M. Mattila, V. Ilacqua, J. Zambrana, J.P.D. Abbatt, A. Abeleira, #C. Arata, P.F. DeCarlo, A.H. Goldstein, L. Hildebrandt Ruiz, M.E. Vance, C. Wang, and D.K. Farmer, Detailed Investigation of the Contribution of Gas-Phase Air Contaminants to Exposure Risk during Indoor Activities, *Environ. Sci. Technol.*, DOI 10.1021/acs.est.2c01381, 56, 17, 12148–12157, 2022.
393. Habre, R., D.C. Dorman, J. Abbatt, W.P. Bahnfleth, E. Carter, D. Farmer, G. Gawne-Mittelstaedt, A.H. Goldstein, V.H. Grassian, G. Morrison, J. Peccia, D. Poppendieck, K.A. Prather, M. Shiraiwa, H.M. Stapleton, M. Williams, and M.E. Harries, Why Indoor Chemistry Matters: A National Academies Consensus Report, *Environ. Sci. Technol.*, doi.org/10.1021/acs.est.2c04163, 56, 15, 10560–10563, 2022.
392. Akherati, A., Y. He, L.A. Garofalo, A.L. Hodshire, D. Farmer, S.M. Kreidenweis, W. Permar, L. Hu, E.V. Fischer, #C.N. Jen, A.H. Goldstein, E.J.T. Levin, P. DeMott, T.L. Campos, F. Flocke, J.M. Reeves, D.W. Toohey, J.R. Pierce, S. Jathar, Dilution and Photooxidation Driven Processes Explain the Evolution of Organic Aerosol in Wildfire Plumes, *Environmental Science: Atmospheres*, DOI: 10.1039/D1EA00082A, 2, 1000-1022, 2022.

391. Wang, C., J.M. Mattila, D.K. Farmer, [#]C. Arata, A.H. Goldstein, and J.P.D. Abbatt, Behavior of Isocyanic Acid and Other Nitrogen-Containing Volatile Organic Compounds in The Indoor Environment, *Environ. Sci. Technol.*, <https://doi.org/10.1021/acs.est.1c08182>, 56, 12, 7598–7607, 2022.
390. Crocker, D.R., C.P. Kaluarachchi, R. Cao, Ruochen, J. Dinasquet, [#]E.B. Franklin, C.K. Morris, S. Amiri, D. Petras, T. Nguyen, R.R. Torres, T.R. Martz, F. Malfatti, A.H. Goldstein, A.V. Tivanski, K.A. Prather, and M.H. Thiemens, Isotopic Insights into Organic Composition Differences between Supermicron and Submicron Sea Spray Aerosol, *Environ. Sci. Technol.*, doi.org/10.1021/acs.est.2c02154, 56, 14, 9947–9958, 2022.
389. Lindsay, A. J., D.C. Anderson, [#]R.A. Wernis, [#]Y. Liang, A.H. Goldstein, S.C. Herndon, J.R. Roscioli, C. Dyroff, E.C. Fortner, P.L. Croteau, F. Majluf, J.E. Krechmer, T.I. Yacovitch, W.B. Knighton, and E.C. Wood, Ground-based investigation of HO_x and ozone chemistry in biomass burning plumes in rural Idaho, *Atmos. Chem. Phys.*, 22, 4909–4928, <https://doi.org/10.5194/acp-22-4909-2022>, 2022.
388. Wong, A.Y.H., J.A. Geddes, J.A. Ducker, C.D. Holmes, [#]S. Fares, A.H. Goldstein, I. Mammarella, J.W. Munger, New evidence for the importance of non-stomatal pathways in ozone deposition during extreme heat and dry anomalies, *Geophysical Research Letters*, <https://doi.org/10.1029/2021GL095717>, 49, 8, 2022.
387. [#]Franklin, E. B., [#]L. D. Yee, B. Aumont, [#]R.J. Weber, P. Grigas, and A.H. Goldstein, Ch3MS-RF: a random forest model for chemical characterization and improved quantification of unidentified atmospheric organics detected by chromatography–mass spectrometry techniques, *Atmos. Meas. Tech.*, 15, 3779–3803, <https://doi.org/10.5194/amt-15-3779-2022>, 2022.
386. Kilgour, D. B., G. A. Novak, J.S. Sauer, A.N. Moore, J. Dinasquet, S. Amiri, [#]E.B. Franklin, K. Mayer, M. Winter, C.K. Morris, T. Price, F. Malfatti, D.R. Crocker, C. Lee, C.D. Cappa, A.H. Goldstein, K.A. Prather, and T.H. Bertram, Marine gas-phase sulfur emissions during an induced phytoplankton bloom, *Atmos. Chem. Phys.*, doi.org/10.5194/acp-22-1601-2022, 22, 1601–1613, 2022.
385. [#]Liang, Y., [#]R.J. Weber, [#]P.K. Miszal, [#]C.N. Jen, and A.H. Goldstein, Aging of Volatile Organic Compounds in October 2017 Northern California Wildfire Plumes, *Environ. Sci. Technol.*, <https://doi.org/10.1021/acs.est.1c05684>, 56, 3, 1557–1567, 2022.
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Patents

US Patent 8,088,627 B2, On-Line Gas Chromatographic Analysis of Airborne Particles (with S. Hering)

Research Grants and Contracts

Funded projects since starting at Berkeley in 1996.

SPONSOR	TITLE	PI	DATES
California Air Resources Board	Statewide Mobile Monitoring Initiative	Apte, Goldstein	2024-2026
Department of Energy ASR	Vertically-Resolved Aerosol Composition Measurements for Improved Understanding of Aerosol Processes and Aerosol-Cloud Interactions Impacting Deep Convection during TRACER	Goldstein	2023-2026
National Oceanic and Atmospheric Administration	Investigating changes in urban methane using a multiplatform approach	Apte, Goldstein	2023-2026
National Science Foundation	Aqueous Aerosol Chemistry: Elucidating the mechanisms causing mismatch between field and laboratory chemical composition of biomass burning organic aerosol	Goldstein	2023-2026
Department of Energy FICUS	Vertically and Size-Resolved Chemical Speciation of Aqueously Processed Organic Aerosols	Goldstein	2022-2024
National Oceanic and Atmospheric Administration	Analyzing Emitted Organic Trace Gas and Aerosol Speciation at the Wildland-Urban Interface and their Atmospheric Chemical Transformations	Goldstein	2022-2025
California Air Resources Board	Understanding and Characterizing Emission Factors from Burning Structures in California Due to Wildfires	Goldstein	2022-2026
National Oceanic and Atmospheric Administration	A multispecies approach to investigate the changing cocktail of atmospheric urban carbon	Goldstein	2020-2023
California Air Resources Board	San Joaquin Valley airborne flux measurement of volatile organic compounds and oxides of nitrogen	Goldstein	2021-2023
California Air Resources Board	Airborne flux measurement of volatile organic compounds and oxides of nitrogen in California	Goldstein	2020-2022
California Air Resources Board	Understanding and Mitigating Wildfire Risk in California	Goldstein	2020-2023
Department of Energy (SBIR Phase I)	Aerosol Chemistry Field Calibration System	Kreisberg, Goldstein	2020
Department of Energy ASR	Advancing Molecular Level Understanding of Aerosol Processes in the Amazon and Integration with Modeling	Goldstein	2019-2024
Sloan Foundation	Renewal: Abundance, Sources, and Fates of Organic Chemicals in Residential Environments	Goldstein	2019-2023
Sloan Foundation	Chemistry of Homes: Environmental Microbes and Moisture	Adams, Misztal, Goldstein	2019-2023

Defense University Research Instrumentation Program (DURIP), Office of Naval Research (ONR)	Acquisition of Proton-Transfer-Reaction Time-Of-Flight Mass-Spectrometer (PTR-TOF-MS) for Airborne Volatile Organic Chemical Concentration and Flux Measurements	Goldstein	2019-2020
National Science Foundation (CAICE-UCSD)	Laboratory Investigation of Oceanic Organic Emissions	Goldstein	2019-2023
National Science Foundation	RAPID: Northern California Wildfire Emissions and their Atmospheric Chemical Transformations in a Highly Populated Urban Region	Goldstein	2018-2019
South Coast Air Quality Management District	Chemically Explicit Measurements and Modeling of Diesel Fuel Evaporative Emissions	Goldstein	2016-2017
National Oceanic and Atmospheric Administration	Fires in the Western US: Analyzing Emitted Speciated Organic Trace Gases and Aerosols and their Atmospheric Chemical Transformations	Goldstein	2016-2021
Sloan Foundation	Abundance, Sources, and Fates of Organic Chemicals in Residential Environments	Goldstein	2016-2020
Sloan Foundation	To Characterize the Microbial Contributions to the Volatile Organic Compounds (VOCs) in the Residential Environments through Temporally and Spatially Resolved VOC Measurements.	Goldstein	2016-2018
Sloan Foundation	Berkeley Indoor Microbial Ecology Research Center (BIMERC), Renewal	Adams, Bruns, Goldstein, Nazaroff, Arens, Lindow, Taylor	2016-2019
Department of Energy ASR	Investigating Secondary Aerosol Processes in the Amazon through Molecular-level Characterization of Semi-Volatile Organics	Goldstein	2015-2020
Department of Energy (SBIR Phase II)	Comprehensive Time-Resolved Molecular Speciation of Gaseous and Particulate Organic Constituents in the Atmosphere (cTAG)	Hering and Goldstein	2015-2019
Energy Biosciences Institute	Organic Indicator Molecules of Biosourcing	Goldstein	2016-2018
Energy Biosciences Institute	Organic Indicator Molecules of Biosourcing	Goldstein	2015
Sloan Foundation	Berkeley Indoor Microbial Ecology Research Center (BIMERC), Renewal	Adams, Bruns, Goldstein, Nazaroff, Arens,	2014-2017

		Lindow, Taylor	
FAPSEP	Interactions between urban and forest emissions in Manaus, Amazonia: The Brazilian component of GoAmazon	Artaxo, Goldstein one of nine international partners	2013-2017
France Berkeley Fund	Understanding the Aerosol Composition from Oxidation of Long-chain Alkanes Using Novel Measurements and Modeling	Goldstein and Aumont	2014-2015
Department of Energy (SBIR Phase I)	Comprehensive, Time-Resolved Molecular Speciation of Gaseous and Particulate Organic Constituents in the Atmosphere	Hering and Goldstein	2014
Sloan Foundation	Emissions from Humans Affect Indoor Air Chemistry	Nazaroff and Goldstein	2014-2015
Biology Faculty Research Fund	Purchase of a volatile organic chemical (VOC) sample collection and introduction system	Goldstein	2013-2014
Presidential Chair Fellows Curriculum Enrichment Grant Program	Flipping the Classroom: Revitalizing Gateway Environmental Science Courses in ESPM	Potts, Firestone, Fung, Rhew, Goldstein	2013-2014
National Science Foundation	GoAmazon 2014 Contributions of Biogenic VOC to Organic Aerosol Formation in the Presence and Absence of Anthropogenic Pollution	Goldstein	2013-2017
California Air Resources Board	Improving Controls and Measurement Methods for Semi-Volatile Organic Compound Emissions from Light-Duty Vehicles	Goldstein, Robinson, and Kroll	2013-2017
NIH National Institute of Environmental Health Sciences	A Compact Instrument for Time-Resolved Airborne Particle Chemistry	Hering and Goldstein	2012-2013
Dreyfus Foundation	Environmental Chemistry of Atmospheric Organic Aerosol Formation	Goldstein	2012-2016
National Science Foundation, Earth Observing Laboratory OFAP	Request for C130 Aircraft, ISFS and ISS deployments in support of the Southern Oxidant and Aerosol Study (SOAS)	Guenther + multiple co-PI's	2013
National Science Foundation	Contribution of Biogenic VOC to Organic Aerosol Formation in the Presence and Absence of Anthropogenic Pollution	Goldstein	2013-2017
US Environmental Protection Agency	Emission, Fate, and Contribution of Biogenic Volatile Organic Compounds to Organic Aerosol Formation in the Presence of Anthropogenic Pollution: Measurements and Modeling During SOAS	Goldstein, Mak, and Guenther	2013-2016
California Air Resources Board	Source Speciation of Central Valley GHG Emissions using In-Situ Measurements of	Goldstein and Fischer	2012-2016

	Volatile Organic Compounds		
Gulf of Mexico Research Initiative	Petroleum Evaporation at water surface and droplet dynamics in turbulence (through Gulf of Mexico Integrated Spill Response Consortium, Texas A&M)	Goldstein and Variano	2011-2015
Department of Energy, Lawrence Berkeley National Laboratory	Discovery LDRD: Oxidative Transformations of Organic Aerosol	Wilson and Goldstein	2011-2013
National Science Foundation	RAPID: TAG-AMS Measurements of Organic Aerosol during the BEACHON-RoMBAS 2011 Field Campaign	Goldstein	2011-2012
UC Berkeley Faculty Fund for the Biological Sciences	Purchase of an Ultraviolet Aerodynamic Particle Sizer (UV-APS, TSI model 43314-05) for serving the Berkeley Indoor Microbial Ecology Research Center	Goldstein, Nazaroff	2011
Department of Energy (SBIR Phase II)	Ultrafine Particle Focusing System to Separate Particulate and Gaseous Constituents of Atmospheric Aerosols	Hering and Goldstein	2011-2013
US Environmental Protection Agency	Evaluation of Mobile Source Emissions and Trends Using Detailed Chemical and Physical Measurements	Harley, Goldstein, Wood	2010-2013
Alfred P. Sloan Foundation	To Investigate the Processes and Source Responsible for Indoor Microbial Communities and Indoor Air Quality	Bruns, Goldstein, Nazaroff, Arens, Lindow, Anderson, Taylor	2010-2014
California Air Resources Board	Improving Regional Biogenic VOC Emission Estimates Using an Airborne PTRMS Eddy Flux Measurement System	Goldstein and Guenther	2010-2013
National Oceanographic and Atmospheric Administration	Measurements of Speciated Organics in Aerosols by Thermal Desorption Aerosol GC/MS (TAG) during CalNex 2010	Goldstein	2010-2013
National Science Foundation	Collaborative Research: Investigating SOA Formation in Central Los Angeles as Part of CalNex 2010	Goldstein	2010-2013
California Air Resources Board	Hourly In Situ Quantitation of Organic Aerosol Marker Compounds during CalNex 2010	Goldstein and Hering	2010-2012
California Air Resources Board	Characterization of the Atmospheric Chemistry in the Southern San Joaquin Valley and an Initial Comparison with Atmospheric Chemistry in the South Coast Air Basin	Cohen and Goldstein	2009-2011
Department of Energy (STTR Phase II)	An In-Situ Instrument to Assess the Concentration and Phase Partitioning of Atmospheric Semi-Volatile Organic Compounds	Hering and Goldstein	2009-2011

Department of Energy (SBIR Phase II)	Characterization of Particulate Organic via Combined Thermal Desorption Aerosol Gas Chromatography and Aerosol Mass Spectrometry (TAG-AMS)	Worsnop, Goldstein, and Hering	2009-2011
National Science Foundation	Biogenic VOC Emission and Organic Aerosol Composition during the Biosphere Effects on Aerosol and Photochemistry Experiment (BEARPEX)	Goldstein	2009-2012
Department of Energy (STTR Phase I)	An In-Situ Instrument to Assess the Concentration and Phase Partitioning of Atmospheric Semi-Volatile Organic Compounds	Hering and Goldstein	2008-2009
Citrus Research Board	Measurements of Ozone Removal and VOC Emissions in Citrus Trees with Implications for Regional Air Quality	Goldstien and Karlik	2007-2010
California Air Resources Board	Flux measurements of biogenic precursors to ozone and particulate matter in the central valley	Goldstien and Karlik	2007-2010
University of California Division of Agricultural and Natural Resources	Automated measurements of organic aerosol composition in agricultural systems using thermal desorption GC	Karlik and Goldstein	2007-2009
California Air Resources Board	Process-Based Farm Emission Model for Estimating Volatile Organic Compound Emissions from California Dairies	Zhang, Mitloehner, Goldstein	2006-2008
Department of Energy (STTR Phases II)	Two-dimensional chromatography of atmospheric aerosols: A new in-situ instrument (additional supplement awarded for 2008-2009)	Hering and Goldstein	2006-2009
National Institute for Global Environmental Change (NIGEC)	Carbon exchange in a Ponderosa Pine Plantation: Strategies of Water use, Seasonality of Plant Physiology, and the Impact of Aerosols on Photosynthesis	Goldstein	2004-2007
Department of Energy (STTR Phase I)	Two-dimensional chromatography of atmospheric aerosols: A new in-situ instrument	Hering and Goldstein	2005-2006
Kearney Foundation	Controls of Canopy Photosynthetic Activity on Roots and Soil Carbon Dynamics in Ponderosa Pine and Oak/Savanna Ecosystems	Goldstein, Cheng, and Baldocchi	2004-2006
National Oceanographic and Atmospheric Administration	Measurements of organic trace gases by PTR-MS in support of ITCT-2K4	Goldstein	2004-2007
California Air Resources Board	Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds	Goldstein	2004-2008
Environmental Protection Agency	Guiding Future Air Quality Management in California: Sensitivity to Changing Climate	Harley, Cohen, and Goldstein	2003-2007
Department of Energy (SBIR Phases)	Speciated Organic Composition of Atmospheric Aerosols: A New, In-Situ	Hering and Goldstein	2002-2006

I and II)	Instrument		
National Oceanographic and Atmospheric Administration	Measurements of Speciated VOC's, OVOCs, and Halocarbons, by Automated in-Situ GC/FID/MSD in Support of the Intercontinental Transport of Chemicals in the Troposphere Field Mission	Goldstein	2002-2005
National Science Foundation	Extending the use of PTR-MS for new measurements of volatile organic compounds and their oxidation products (2 funded proposals, phases I & II)	Goldstein	2001-2010
Kearney Foundation	Controls of Canopy Activities on Roots and Soil Carbon Dynamics in a Young Ponderosa Pine Forest	Goldstein, Cheng, and Qi	2002-2003
California Air Resources Board (CARB)	Quantifying Biogenic Terpene Emissions and assessing their importance for Secondary Aerosol Formation	Goldstein	2001-2003
UC Berkeley	Organized Research Unit (ORU), Atmospheric Science Center	Multiple PI's	2000-2011
California Air Resources Board	Whole Ecosystem Measurements of Biogenic Hydrocarbon Emissions	Goldstein	1999-2002
Department of Energy, Lawrence Berkeley National Laboratory	Atmospheric Change at the Interface Between Regional and Global Scales	Multiple PI's, Cohen et al.	1999-2001
National Aeronautics and Space Administration (Jointly with NSF 1998-2002)	An Isotopic Approach for Determining the Industrial Fraction of the Total CH ₃ Br Source to the Atmosphere (3 separate grants – Phases I, II, and III)	Goldstein	1998-2005
Environmental Protection Agency	Modeling Ozone Flux to Forests Across an Ozone Concentration Gradient in the Sierra Nevada Mts., CA	Goldstein	1998-2002
National Science Foundation (Jointly with NASA)	An Isotopic Approach for Determining the Industrial Fraction of the Total CH ₃ Br Source to the Atmosphere	Goldstein	1998-2004
National Atmospheric and Space Administration (Jointly with NSF)	An Isotopic Approach for Determining the Industrial Fraction of the Total CH ₃ Br Source to the Atmosphere	Goldstein	1998-2006
UC Berkeley, Agricultural Experiment Station	Linking Carbon and Water Cycling in Sierra Nevada Forests to the Dynamics of Ozone and Hydrocarbon Exchange	Goldstein	1998-2009
Hellman Family Faculty Fund	A Field-Based Study of Sierra Nevada Forest Response to Anthropogenic Ozone and Nitrogen Deposition	Goldstein	1997-1999
Environmental Protection Agency	Biogenic Hydrocarbon Emissions from a Sierra Nevada Ponderosa Pine Plantation	Goldstein	1997-1998
Department of Energy, Lawrence Berkeley National	Global Climate Change: Regional Effects and Potential Consequences of Adaptation and Mitigation Measures in California	Multiple PI's, DePaolo et	1997-1998

Laboratory		al.	
UC Berkeley, Junior Faculty Research Grant	Impacts of Ozone Deposition on Carbon Uptake Rates in a Sierra Nevada Ponderosa Pine Plantation	Goldstein	1997-1998
UC Berkeley, Agricultural Experiment Station	Determination of Volatile Organic Carbon Emission Rates from Biogenic Sources in California	Goldstein	1996-1998

Courses Taught

ESPM 2 -The Biosphere, 3 unit lower division lecture, 1996-2002

ESPM/EPS c180/CEE c106 -Air Pollution, 3 unit upper division lecture, 1997-2006, 2008, 2010-2018, 2020-2022, 2024

ES 10 –Introduction to Environmental Science, 3 unit lower division lecture, 2004-2012

ESPM 15 -Introduction to Environmental Science, 3 unit lower division lecture, 2014-2018

NR 24 -Freshman Seminar, 1 unit lower division seminar, 1999 – 2006, 2014

NR 84 -Sophomore Seminar, 1 unit lower division seminar, 2006, 2014

ESPM 98/198 - South American Rainforest, Sponsor -2 unit student taught course, 1999

Guest Lectures in many courses including, ESPM200a, ESPM 201a, ESPM 111, ESPM 102B, ESPM 100, ESPM 2, ESPM 10, ESPM 12, ESPM 15, EPS 182, ES 10, CHEM 295.

Students/Postdoctoral Researchers Supervised at UC Berkeley (Goldstein Students)

Ph.D. - Meredith Kurpius (graduated), Dylan Millet (graduated), Anita Lee (graduated), Brent Williams (graduated), Nicole Bouvier (graduated), Jeong-Hoo Park (graduated), Yunliang Zhao (graduated), Drew Gentner (graduated), Rachel Sellon O'Brien (graduated), Abhinav Guha (graduated), Gabriel Isaacman (graduated), Jeremy Nowak (graduated), Ellyn Gray (graduated), Caleb Arata (graduated), Rebecca Wernis (graduated), Emily Barnes Franklin (graduated), Yutong Liang (graduated), David Lunderberg (graduated), Betty Molinier (graduated), Erin Katz, Jennifer Ofodile, Michael Milazzo.

M.S. - Nathan Hultman (graduated), Mark Lamanna (graduated), Kevin Olson (graduated).

Postdoctoral Researchers - Jianwu Tang (finished), Ming Xu (finished), Jeanne Panek (finished), Gunnar Schade (finished), Markus Bill (finished), Sean McCauley (finished), Jean-Marc Fracheboud (finished), Allison Steiner (finished), Stephanie Shaw (finished), Dylan Millet (finished), Rupert Holzinger (finished), Laurent Misson (finished), Colette Heald (finished), Dan Matross (finished), Elena Ormeno (finished), David Worton (finished), Silvano Fares (finished), Arthur Chan (finished), Chris Ruehl (finished), Pawel Misztal (finished), Omar Amador (finished), Xiaochen Tang (finished), Nicole Richards (finished), Haofei Zhang (finished), Greg Drozd (finished), Coty Jen (finished), Yingjun Liu (finished), Lindsay Yee (finished), Kasper Kristensen (finished), Yilin Tian (finished), Caleb Arata (finished), Deep Sengupta (finished), Eva Pfannerstill (finished), Michael Alves (finished), Tiffany Zhao (finished), David Lunderberg (finished), Samuel Cliff, Shan Gu.

Undergraduate Student Researchers - Kirill Deninzon (graduated), Anita Lee (graduated), Jeremy (graduated), Joshua Klein (graduated), Gavin McMeeking (graduated), Gabrielle Dreyfus (graduated), Max Henkle (graduated), Ben Lee (graduated), Camus Tung (graduated), Stephanie Wheeler (graduated), Steven Andrews (graduated), Amanda Frossard (graduated), Ya-Ting Liu

(graduated), Raymond Lo (graduated), Joshua Pepper (graduated), Laura Davis (graduated), Sara Forestieri (graduated), Claire Davis (graduated), Luis Mendez (graduated), Kelsey Boulanger (graduated), Monika Decker (graduated), Jeffrey Wong (graduated), Irene Huang (graduated), Trevor Ford (graduated), Steve Shen (graduated), Joshua Moss (graduated), Hannah Hagen (graduated), Michael Curtis (graduated), Ventura Rivera (graduated), Mariana Rivas (graduated), Alexander de Frondeville (graduated), Connor Shangai (graduated), Hellas Lee (graduated), Nathan Sweet (graduated), Hannah Castro (graduated), Benjamin Weinberger (graduated), Jessica Zhao, Isaac Alejandro Santillan, Enming (Tiger) Zhang, Stephanie Xu, Fangyuan Li, Jack Yang.

Total Undergraduates – 42; Total Graduate students – 25; Total Postdocs – 39

College, Department or other University Committees

University of California, Berkeley:

Co-Chair Working Group CNR-BSD
 Privilege and Tenure (P&T)
 Systemwide Assembly Representation Committee (AREP)
 Divisional Council (DIVCO)
 Faculty Budget Working Group (GIMLET)
 Committee on Committees (COMS)
 UC Berkeley Representative to Systemwide COMS (UCOC)
 Academic Senate Committee on Undergraduate Scholarships and Honors and
 Financial Aid (CUSHFA)
 CUSHFA Financial Aid Subcommittee
 Academic Senate Committee on Undergraduate Scholarships and Honors (CUSH)
 CUSH Regents and Chancellors Scholarship Subcommittee
 CUSH Financial Aid Subcommittee
 Berkeley Atmospheric Science Center (BASC) ORU Founding Core Member
 BASC Director Faculty Search Committee
 BASC Curriculum Committee
 BASC Seminar Committee (many times)
 BASC Symposium Organizing Committee (many times)
 Executive Committee of the Environmental Council
 Review Committee, Camille Dreyfus Teacher-Scholar Award
 Review Panel, UC President's Postdoctoral Fellowship Program
 Affiliate of Energy and Resources Group, UC Berkeley
 Ad-Hoc Review Committee for many promotion cases
 Hellman Junior Faculty Award Review Committee
 Freshman Seminar Program Dinner Series Faculty Participant
 CEE Engineering for Sustainability Faculty Search Committee
 Climate Readiness Institute Committee

College of Natural Resources:

Associate Dean for Academic Affairs
 Chair of the Faculty, Executive Committee
 Dean's Council
 Strategic Plan Committee
 Chair Global Environment Theme House (developed residential program)
 Member Executive Committee of the College of Natural Resources
 Co-Director Center for Stable Isotope Biogeochemistry
 Undergraduate Advisor, Undeclared Major Students
 Environmental Science Major Faculty Advisory Board
 Co-Chair and organizer for Blodgett Forest Research Symposium, multiple years

Exploratory Project on a Consortium for the Environment
Center for Stable Isotope Biogeochemistry Oversight Committee
Center for Forestry Scientific Advisory Council
Blodgett Forest Research Center Property Committee
Hilgard Hall Renovation Planning Committee
Vision Committee

Department of Environmental Science, Policy, and Management:

Chair Department
Chair ESPM Council
Chair Space Committee
Fundraising Committee
Faculty Awards Committee
Many Faculty Search Committees
Ecosystem Sciences Divisional Plan Committee
Chair Biogeochemistry Subgroup of Divisional Plan Committee
Graduate Advisor & Graduate Admissions Committee
Proposal Committee for Soil Physics Faculty Position
Library Committee
Space Committee
Social Committee
Ad-Hoc Promotion Review Committees (many Tenure, Full Professor)
Lecturer Review Committees