# MARK HERNANDEZ PhD, PE

7/31/2025 LV

## EDUCATION

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|---|---|---|
| **Post-Doctoral** | **University of California at Berkeley,** Environmental Engineering, Topic: Subsurface Bioremediation, Advisor: Lisa Alvarez-Cohen | 1995 |
| **PhD** | **University of California at Berkeley,** Environmental Engineering, Minors: Chemical Engineering and Microbiology, Advisor: David Jenkins | 1992 |
| **MS** | **University of California at Berkeley,** Civil Engineering, | 1988 |
| **BS** *Cum Laude* | **University of California at Berkeley,** Civil Engineering, | 1986 |

## ACADEMIC, CONSULTING and LEADERSHIP EXPERIENCE

**2021 – 25** **Executive Committee,** Department of Civil, Environmental and Architectural Engineering, one of a six member executive board overseeing the policy and operations this academic department.

**2019 - 23** **Salvador Juan Archuleta Endowed Chair** of Civil and Environmental Engineering.

**2019 - 22** **Faculty Director,** University of Colorado-Colorado Mesa University joint program in Engineering

**2009- 23** **Executive Committee**, **The Leadership Alliance**, one of a five-member executive board overseeing the policy and operations of this premier NGO, promoting diversity in graduate higher education.

**2008/13** **Associate Editor, Aerosol Science and Technology,** The Journal of the American Association for Aerosol Research, Taylor and Francis Publishers, New York,

**1994 -** **Registered Professional Civil Engineer,** active technical consultant and expert witness for the commercial biological waste treatment and industrial hygiene sectors since 1994 [CA License # C 054989].

**2002/13** **Director, The Colorado Diversity Initiative** *University of Colorado at Boulder*. As the only STEM faculty member who was a Principal Investigator of an AGEP grant (of 22 awarded nationwide), I was one of two directors of the Colorado Diversity Initiative. I conceived, designed and led this joint NIH NSF-funded program to integrate graduate students from socioeconomic groups that remain underrepresented in STEM.

**1996 -** **Professor (Tenured 2002),** *University of Colorado at Boulder*. Full professor and principal investigator leading an externally funded graduate research program in applied microbiology. Lecture instructor for courses on environmental engineering, thermodynamics, microbiology and toxicology for engineers.

**1994/95** **Postdoctoral Researcher,** *University of California at Berkeley*. Lead independent research to apply quantitative microscopy and biochemical assays to evaluate bioremediation in solvent contaminated soils.

**1989/94** **Civil Engineer**, *City and County of San Francisco*, Responsible to the Engineering Bureau for in-house process engineering and research projects for the City's main wastewater treatment facilities (part-time ’89 - ‘92). Full-time member of the start-up team for the state-of-the-art Oceanside Water Pollution Control Plant (’92-’94).

**1986/88** **Environmental Engineer**, *Oro Loma Sanitary District (OLSD)/CH2M Hill Inc.,* Oakland, CA. Served as liaison and staff engineer to CH2M Hill, Inc. for the District’s master plan and expansion.

## FELLOWSHIPS, HONORS, and AWARDS

University of Colorado, Dept. of Civil Engineering, Distinguished Research Award, 2023
The S. J. Archuleta Endowed Chair in Civil and Environmental Engineering, 2019
Great Minds in STEM Foundation, Hispanic Educator of the Year, 2012
President’s Commendation for Advancing Diversity, University of Colorado System, 2008
University of Colorado, Dept. of Civil Engineering, Teaching Award, 2003
Association of Environmental Engineering and Science Professors, Advisor to Outstanding Doctoral Dissertation, 2001
University of Colorado, Dept. of Civil Engineering, Young Researcher Award, 2000
National Science Foundation, CAREER Award, 1997
Water Environment Federation, Robert Canham Award, 1992

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7/31/2025 LV

## Major Extramural Grant Summary (at the University of Colorado since 1996):

**Pending proposal amounts are highlighted**

| | PI | Co-PI |
|---|---|---|
| **NSF (including Career):** | **$ 9.95 M** | **$ 560 K** |
| **NIH** | **$ 750 K** | **$ 1.46 M** |
| **EPA** | **$ 285 K** | |
| **DOD** US ARMY | **$ 530 K** | **$ 2.35 M** |
| **DARPA/ARPA-H** | **$ 2.2 M** | **$ 750 K** |
| **CDC** | | **$ 2.25 M** |
| **Foundations** Sloan, Gates, Tito Lindbergh, Ryan | **$ 1.75 M** | **$ 575 K** |
| **State of Colorado** DIA & CDPHE | **$ 5.85 M** | **$ 35 K** |
| **Corporations** Boeing / Intel/ Lysol Carrier / Clorox, Honeywell | **$ 2.91 M** | **$ 235 K** |

## NATIONAL ACADEMY SERVICE

Urbanization and Slums: New Transmission Pathways of Infectious Diseases in the Built Environment (2017/2018)

Standards for the Microbiology of the Built Environment (2016/2017)

Review of Environmental Risk Assessment for Expansion of Facilities for Experimentations with Airborne Agricultural Pathogens National Biocontainment Animal Facility: NBAF (2011/2012):

Review of Environmental Risk Assessment for Expansion of Facilities for Human Pathogens Research at the Army Medical Research Institute for Infectious Diseases: USAMRIID (2009)

## INTELLECTUAL PROPERTY (US and PCT Patents with Graduate Students):

**Hernandez, M.,** Justo Reinoso I. and Caicedo-Ramirez A. (2023) Compositions for Controlling Microbially Induced Concrete Corrosion. US 2023/0072595 and PCT UC2021/014387

**Hernandez, M.** and Biesiada, E, (Issued 2023) Peroxide enhanced germicidal irradiation for the treatment of airborne and surface-associated contaminants **WO 2022/ 272169 A1,**

**Hernandez, M.,** Bilgin, A.A. and Grubb D.G. (Issued 2022) *Sequestration of macronutrients from anaerobic wastewater treatment with iron and steelmaking residuals.* US Patent # **11,225,427**, **PCT WO 16998 A1.**

**Hernandez, M.**, Nieto-Caballero, M., Keady, P, (Issued 2022) High Fidelity Bioaerosol Capture Directly into Genomic Preservatives, **PCT/US18/67687**.

**Hernandez, M.**, Abu-Dalo, Khanna, G, and Quick, A. (Issued 2018) *Metal Removal System*, US Patent # **10,106,437,**

**Hernandez, M.**, and Ling A., (Issued 2016) *pH directed Delivery of Heavy Metals for the in-situ Inhibition of Microbially Induced Concrete Corrosion*. **PCT WO 070196**, US-9924723-B2,

**Hernandez, M.** and Abu-Dalo, M. ,(Issued 2008), *Removing Metals from Solutions Using Metal Binding Compounds and Sorbents Therefore*, US Patent # **7,361,279**.

**Hernandez, M.**, Abu-Dalo, M. & Nevostrueva, S., *Methods and Apparatus for Coupling Activated Carbon with Corrosion Inhibitors and Co-Ligands for Immobilizing Heavy Metals*. US **61/362,279**

***TECHNICAL ARCHIVAL PUBLICATIONS (chronological listing; H-index 47)***

Orr, R.J.S., Brynildsrud, O. Bøifot, K. Gohli, J., Skogan, G., Kelly, F. **Hernandez, M**., Udekwu, K, Lee P.K.H., Mason, C.E., and Dybwad, M. (2025) Spatial and Temporal Patterns of Public Transit Aerobiomes *bioRxiv* 2025.04.21.649744; doi: https://doi.org/10.1101/2025.04.21.649744

Eidem, T., Rugh, K. and **Hernandez, M.** (2025) $UV_{222}$ exposure decrease immune-based recognition of common airborne allergens, *Environmental Science and Technology*,

Kraus, E., Prithiviraj, B. and **Hernandez M.** (2025) Advancing transcriptomic profiling of airborne bacteria. *Applied and Environmental Microbiology*, 10.1128/aem.00148-25

Ildiri, N., Biesiada, E., Facchinetti, T., Alglani, N., Ahmed, N., and **Hernandez, M.** (2025) Impacts of HVAC Cleaning on Energy Consumption and Supply Airflow: A Multi-Climate Evaluation, *Energy and Buildings*, 328, 115147.

Eidem, T., Nordgren, T. and **Hernandez, M**. (2024) Bioaerosol Exposures and Respiratory Diseases in Cannabis Workers. *Current Allergy and Asthma Reports* **24**, 395–406.

Lee JYY, Miao Y, Chau RLT, **Hernandez M**, and Lee PKH. (2023) Artificial intelligence-based prediction of indoor bioaerosol concentrations from indoor air quality sensor data. *Environment International,* 174, 107900.

Warren, M. Crespo-Medina, M., Ramírez Toro, G., Rodriguez, R.A., **Hernandez, M.,** Rosario-Ortiz, F., and Korak, J.A. (2023), Quality in Puerto Rico after Hurricane Maria: Challenges Associated with Water Quality Assessments and Implications for Resilience *ACS EST Water* 2023, 3, 2, 354–365

Nieto-Caballero, M., Davis, R., Fuques Villalba, E., Gomez, O., Huynh, E., Handorean, A., Ushijma, S, Tolbert, M., and **Hernandez, M**., (2023) Carbohydrate vitrification in aerosolized saliva is associated with the humidity-dependent infectious potential of airborne coronavirus, *Proceedings of the National Academy of Science, Nexus,* https://doi.org/10.1093/pnasnexus/pgac301

Crimaldi, J., True, A., Linden, K., **Hernandez, M.**, Larson, L. and Pauls, A. (2022) Commercial toilets emit energetic and rapidly spreading aerosol plumes, *Nature Scientific Reports*, **12**, 20493, https://doi.org/10.1038/s41598-022-24686-5

Jaenisch T, Lamb M ,Gallichotte E, **Hernandez M**., *et al*. (2022) Investigating transmission of SARS-CoV-2 using novel face mask sampling: a protocol for an observational prospective study of index cases and their contacts in a congregate setting. *BMJ Open* 2022;12:e061029. doi:10.1136/ bmjopen-2022-061029

Gomez, O, McCabe, K., Biesiada, E., Volbers, B., Kraus, E., Nieto-Caballero, M., and **Hernandez, M.**, (2022) Airborne murine coronavirus response to low levels of hypochlorous acid, hydrogen peroxide and glycol vapors, *Aerosol Science and Technology*, 56:11, 1047-1057, DOI: 10.1080/02786826.2022.2120794

Shaughnessy, R., **Hernandez, M.** and Haverinen-Shaughnessy, U. (2022). Effects of classroom cleaning on student health: a longitudinal study. *Journal of Exposure Science & Environmental Epidemiology.* 1-7. 10.1038/s41370-022-00427-8.

Meese, A., Kim, J., Wu, X., Le, L., Napier, C., **Hernandez, M.**, Laroco, N., Linden, K., et al and Kim, J. (2022) Opportunities and Challenges for Industrial Water Treatment and Reuse, *Environmental Science and Technology Engineering 2*(3): 465-488.

Meecham, P., **Hernandez, M.** et al. (2022) Biological Air Quality Considerations for non-healthcare, as-built environments, *Infection Control*, Global Biorisk Advisory Council, www.IC.tips, .

Nieto Caballero, M., Gomez, O., Shaughnessy, R. and **Hernandez M.**, (2021) Aerosol Fluorescence, Airborne Hexosaminidase, and Quantitative Genomics Distinguish Reductions in Airborne Fungal Loads Following Major School Renovations, *Indoor Air*, 2021:00:1-9, DOI: 10.1111/ina.12975.

Danko, D., Bezdan, D., Afshin, E., the International MetaSUB consortium with **Hernandez, M.,** Nieto-Caballero, M., (2021), A global metagenomic map of urban microbiomes and antimicrobial resistance, *Cell*, doi: 10.1016/j.cell.2021.05.002

Leung, M., Tong, Q.; Bøifot, B.; Bezdan, D.; Daniel J. Butler, D. Danko, D., Gohli, J., Green, D., **Hernandez, M.**, *et al.*, (2021) Characterization of public transit air microbiome and resistome reveals geographical specificity. *Microbiome,* doi: 10.1186/s40168-021-010447

Zulli A,, Bakker A., Racharaks, R. , Nieto-Caballero, M., **Hernandez, M.**, Shaughnessy, R., Haverinen-Shaughnessy, U., M. Ijaz, K., Rubino, J., Peccia, J., (2021) Occurrence of respiratory viruses on school desks, *American Journal of Infection Control*, doi.org/10.1016/j.ajic.2020.12.006

Justo-Reinoso, I., **Hernandez, M.**,. and Srubar, W., (2021) Influence of copper-impregnated basic oxygen furnace slag on the fresh- and hardened-state properties of antimicrobial mortars *Cement & Concrete Composite*s

Abu-dalo, M., Nevostrueva, S., and **Hernandez, M**., (2020) Removal of radionuclides from acidic solution by activated carbon impregnated with methyl- and carboxy-benzotriazoles. *Nature Scientific Reports*, 10, 11712.

Justo-Reinoso, I., **Hernandez, M.**, Lucero, C. and Srubar, W. (2020) Dispersion and effects of metal impregnated activated granular activated carbon particles on the hydration of antimicrobial mortars, *Cement & Concrete Composite*s 110(7):103588

Ereth, M., Hess, D., Driscoll, A, **Hernandez, M.,** and Stamatotos, F.**,** (2020) Particle control reduces fine and ultrafine particles great than HEPA filtration in live operating rooms and kills biologic warfare surrogate, *American Journal of Infection Control*, doi:10.1016/j.ajic.2019.11.017

Justo-Reinoso, I. and **Hernandez, M**., (2019) Use of Sustainable Antimicrobial Aggregates for the In-Situ Inhibition of Biogenic Corrosion on Concrete Sewer Pipes. *Materials Research Society Advances*, 4(54):2939

Duflot, V., Tulet, P., Flores, O., Barthe, C., Colomb, A., Deguillaume. L., Vaïtilingom, M., Perring, A., Huffman, A., **Hernandez, M.,** et al. (2019) Preliminary results from the FARCE 2015 campaign: multidisciplinary study of the forest–gas–aerosol–cloud system on the tropical island of La Réunion, *Atmos. Chem. Phys., 19, 10591*

Ramirez, A., Laroco, N., Bilgin, A., Shiokari, S., Grubb, D. and **Hernandez, M.,** (2019), Engineered addition of slag fines for the sequestration of phosphate and sulfide during mesophilic anaerobic digestion, *Water Environment Research*, 92: 455

Justo-Reinoso, I., Caicedo-Ramirez, A., Srubar, W. and **Hernandez, M.**, (2019) Fine aggregate substitution with acidified activated carbon influences fresh-state and mechanical properties of ordinary Portland cement mortars, *Construction and Building Materials,* 207:59

Caballero-Nieto, M., Savage, N., Keady, P. and **Hernandez, M.**, (2019), High Fidelity Recovery of Airborne Genetic Materials by Direct Condensation into Genomic Preservatives, *Journal of Microbiological Methods*, 157(2):1

Turner, J, McCabe, K., Snowder, J, and **Hernandez, M**. (2018) β-glucan Induces Multimodal Toxicity Responses in Parallel Exposures of Model Human Lung Epithelial Cells and Immature Macrophage, *Air Quality, Atmosphere & Health*, 10.1007/s11869-018-0649-2

Gevaudan,J. P., Caicedo-Ramirez, A., **Hernandez, M.** and Srubar, W. (2018) Copper and Cobalt Microadditives Improve the Acid Resistance of Alkali-Activated Cements, *Cement and Concrete Research,* 115:327

Grubb, D., Landers, D., Almeida Guerra, P., Miller, B., Bilgin, A., and **Hernandez, M.** ,(2018) Sugarcane Bagasse as a Microbial Host Media for the Passive Treatment of Acid Mine Drainage, *ASCE J of Environmental Engineering,* 144:10

Abu-Dalo, R.A., AbuDalo, M.A., and **Hernandez, M.,** (2018) Stability of Benzotriazole Derivatives with Free Cu, Zn, Co and Metal-Containing Enzymes: Binding and Interaction of Methylbenzotriazoles with Superoxide Dismutase and Vitamin B12. *IOP Materials Science and Engineering*, 305:012024

Ababneh, A. N., Abu-Dalo, M.A., Horn, C. and **Hernandez, M. ,** (2018) Polarographic Determination of Benzotriazoles and their Sorption Behavior on Granular Activated Carbon, *Int. J. Environmental Science and Technology,* doi.org/10.1007/s13762-018-1706-y

Abu-Dalo, M.A., O'Brien, I., and **Hernandez, M.** (2018) Effects of Substitutions on the Biodegradation Potential of Benzotriazole Derivatives, IOP *Materials Science and Engineering*, 305:012020

Justo-Reinoso, I., Srubar, W.V., Caicedo-Ramirez, A., and **Hernandez, M.**, (2018) Fine aggregate substitution by granular activated carbon can improve physical and mechanical properties of cement mortars, *Construction and Building Materials,* 164 750-759.

Mehsah-Attipoe, J., Taubel, M., **Hernandez, M.**, Pitkaranta, M., and Reponen, T., (2017) Toward a better understanding of the potential benefits and adversity of microbe exposures in the indoor environment, *Indoor Air*, 27:1, 3-5

Caicedo Ramirez, A., Ling, L., and **Hernandez, M.,** (2016) Diffusion susceptibility demonstrates relative inhibition potential of sorbent-immobilized heavy metals against sulfur oxidizing acidophiles, *Journal of Microbiological Methods, 131:42-44.*

**Hernandez, M.**, Perring, A.E., McCabe, K., Kok, G., Granger, G. and Baumgardner, D., (2016) Chamber catalogues of optical and fluorescent signatures distinguish bioaerosol classes, *Atmospheric Measurement Techniques*, 9, 3283-3292, doi:10.5194/amt-9-3283-2016

Handorean A. M., Robertson, C., Harris, J.K, Frank, D.N, Kotter, C., Stevens M.J., Pace, N.R., and **Hernandez, M.** (2105) Microbial aerosol liberation from soiled textiles isolated during routine residuals handling in modern health care setting. *Microbiome*, 3:72

Levin, H., Taubel, M., and **Hernandez, M**. (2015) Microbiology of the Built Environment, Healthy Buildings Europe *Microbiome*, 3:68.

Perring, A. E., Schwarz, J. P., Baumgardner, D. **Hernandez, M**., Spracklen, D. V., Heald, C. L., Gao, R. S., Kok, G., McMeeking, G. R., McQuaid, J. B., and Fahey, D. W., (2015) Airborne observations of regional variation in fluorescent aerosol across the United States, *Journal of Geophysical Research: Atmospheres* 120(3):1153

Turner, J, **Hernandez, M**, Snowder, J, Handorean, A, and McCabe, K., (2015) An optimized analytical suite for comparing toxicity effects of diesel exhaust particles and their extracts on human lung cells, *Aerosol Science and Technology* 49(**8**):599

Ling, A., Robertson, C., Harris, J.K, Frank, D.N, Kotter, C., Stevens M.J., Pace, N.R., and **Hernandez M**. (2014) High-resolution microbial community succession of microbially induced concrete corrosion in working sanitary manholes. *PLoSOne*, DOI: 10.1371/journal.pone.0116400

Ling, A., Robertson, C., Harris, J.K, ,Frank, D.N, Kotter, C., Stevens M.J., Pace, N.R., and **Hernandez M**. (2014) Carbon Dioxide and Hydrogen Sulfide Associations with Regional Bacterial Diversity Patterns in Microbially Induced Concrete Corrosion, *Environmental Science & Technology,48* (13): 7357

Abu Dalo, M, Nevostrueva, S, and **Hernandez, M,** (2014) Enhanced Copper (II) Removal from Acidic Water By Granular Activated Carbon Impregnated with Carboxybenzotriazole, *Environmental Science and Development*, *APCBEE* 5: 64

Ling, A.L., Pace, N.R., **Hernandez, M**., and LaPara, T. (2013) Tetracycline Resistance and Class 1 Integron Genes Associated with Indoor and Outdoor Aerosols, *Environmental Science & Technology 47* (9): 4046

Rodriguez, M., Koll, P., Frank, D., Robertson, C., **Hernandez, M.** and Pace, N. (2013) Molecular Analysis of Bacterial and Circovirus Bioaerosols in Concentrated Animal Feeding Operations, *Aerosol Science and Technology*, **47:**755

Portelli, L., Madapatha, D., Martino, C., **Hernandez, M.** and Barnes, F. (2012) Reduction of the background magnetic field inhibits ability of Drosophila melanogaster to survive ionizing radiation, *Bioelectromagnetics*, 33:8, 706-709.

McCabe, K.M., Turner, J. and **Hernandez M.** (2012) A method for assessing the disinfection response of microbial bioaerosols retained in antimicrobial filter materials and textiles. *Journal of Microbiological Methods*. 92(1):11

Kujundzic, E., Greenberg A., Fong, R. and **Hernandez, M**. (2011) Monitoring Protein Fouling on Polymeric Membranes Using Ultrasonic Frequency-Domain Reflectometry, *Membranes* 1: 195

McCabe, K., Lachenrdo, E.J., Albino-Flores I., Sheehan, E.,and **Hernandez M**., (2011) LacI(Ts)-Regulated Expression as an *In Situ* Intracellular Biomolecular Thermometer, *Applied and Environmental Microbiology*, 77 (9): 2863

Bielefeldt, A., Gutierrez-Padilla, M.G.D., Ovtchinnikov, S., Silverstein, J. and **Hernandez, M., (**2010). Bacterial kinetics of sulfur oxidizing bacteria and their biodeterioration rates of concrete in 14 sewer pipe samples. J. Environ. Eng.-ASCE. 136(7):731

Stenerson, J., Blanchard, L., Fassiotto, M., **Hernandez, M**., and Muth, A., (2010) The Role of Adjuncts in the Professorate, *Peer Review*, 12 (3):23

Martins, C.F., Portelli,, L., McCabe, K., **Hernandez, M.,** and Barnes, F., (2010) Reduction of the Earth's Magnetic Field Inhibits Growth Rates of Model Cancer Cell Lines. *Bioelectromagnetics*, 31(8):649.

Coz, E., Artinano, B., Clark, L., **Hernandez, M**., Robinson, A., Casuccio, G, Lersch, T, and Pandis, S., (2010) Seasonal Variations of Fine Primary Biogenic Aerosol Particles in the Northeastern US, *Atmospheric Environment*, 44:3952

McCabe, K., and **Hernandez, M.,** (2010) Molecular Thermometry, *Pediatric Research*, 67:469.

K. Ryan, K.M. McCabe, N. Clements, L. Erickson, **M. Hernandez**, and S. Miller, (2010) Bioaerosol Inactivation Using Ultraviolet Germicidal Irradiation in Flow-Through Control Devices, *Aerosol Science and Technology*, 44:541

Gutierrez-Padilla, G.D., Bielefleldt, A., Ovtchinnikov, S., **Hernandez, M.** and Silverstein, J. (2010) Biogenic Sulfuric Acid Attack on Different Types of Commercially Produced Concrete Sewer Pipes, *Cement and Concrete Research*, 40:293

Rodriguez, M., Walker, J., Pace, N. and **Hernandez, M.** (2010) Molecular Source Tracking of Bioaerosols in the Quarantined Katrina Flood Zone. *Aerosol Science and Technology*. 44:1.

Kujundzic, E., Greenberg, A.R., Fong, R., Moore, B., Kujundzic, D. and **Hernandez, M**. (2010) Biofouling Potential of Industrial Fermentation Broth During Microfiltration, *Journal of Membrane Science*, 349:44.

Pontius, F. A, Amy, G. and **Hernandez M.** (2009) Fluorescent microspheres as virion surrogates in low-pressure membrane studies. *Journal of Membrane Science,* 335:43

Kowalski, W, Bahnfleth, W. and **Hernandez, M.** (2009) A genomic model for the prediction of Ultraviolet inactiation rate constants for RNA and DNA viruses. *IUVA News*, 11(2):15-28.

Kujundzic, E., Cobry, K., Greenberg, A., and **Hernandez, M**. (2008) Use of Ultrasonic Sensors for Monitoring Membrane Fouling and Cleaning, *Journal of Engineered Fibers and Fabrics* 3: 35.

Fierer, N., Liu, Z., Rodriguez, M., Knight, R., Henn, M., and **Hernandez, M**. (2008) Short-Term Temporal Variability in Airborne Bacteria and Fungal Populations, A*pplied and Environmental Microbiology*, **74(1)**:200

Sievers, R.E., Quinn, B.P., Cape, S.P., Searles, J.A., Braun, C.S., Bhagwat, P., Rebits, L.G., McAdams, D.H., Berger, J.L., Lindsay, L., **Hernandez, M.**, Kisich, K.O., Iacovangelo, T., Kristensen, D., Chen, D. (2007) Near-Critical fluid micronization of stabilized vaccines, antibiotics, and anti-virals, *Journal of Supercritical Fluids*, **42**:385

Kujundzic, E., Evans, E., Fonseca, C.M., Greenberg, A.R., **Hernandez, M.** (2007) Ultrasonic Monitoring of Early-Stage Biofilm Growth on Polymeric Surfaces, *Journal of Microbiological Methods***, 68 (3):** 458.

Goebes M. D. , Hildemann L.M., Kujundzic, E., and **Hernandez, M**. (2007) Real-Time PCR for Detection of Airborne *Aspergillus*, *Journal of Environmental Monitoring*, **9**:599

Kujundzic, E., Miller S., and **Hernandez, M**. (2007). Ultraviolet Germicidal Irradiation Inactivation of Airborne Fungal Spores and Bacteria in Upper-Room Air and HVAC In-Duct Configuration. *Journal of Environmental Engineering and Science,* **6**:1.

Fonseca, A.C., Summers, R.S., Greenberg, A.R. and **Hernandez, M.** (2007) Modeling Associations of Extra-Cellular Polysaccharides, Natural Organic Matter and Soluble Microbial Products with Membrane Biofouling, *Environmental Science and Technology.,* **41** (7), 2491

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Kujundzic, E., **Hernandez, M.**, and Miller, S.L. (2006) UV Air Cleaners and Upper-Room Air UV Germicidal Irradiation for Controlling Airborne Bacteria and Fungal Spores. *Journal of Occupational and Environmental Hygiene*, **3(10):**536

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Kujundzic, E., **Hernandez M.**, and Miller, S.L. (2006) Particle size distributions and concentrations of airborne endotoxin using novel collection methods in homes during the winter and summer seasons. *Indoor Air*, **16**:216

Dow S.M., von Gunten U., Lively, G., Chandrakanth, M, Amy, G., and **Hernandez M.** (2006) The Impact of Selected Water Quality Parameters on the Inactivation of *Bacillus subtilis* Spores Using Monochloramine and Ozone, *Water Research*, **40**:373.

Angenent, L., Kelly, S., St. Amand, A., Pace, N., and **Hernandez, M.** (2005) Molecular identification of potential Pathogens in the air and water of a hospital therapy pool. *Proceedings of the National Academy of Sciences.* **102:** 4860

Xu, P., Kujundzic, E., J. Peccia, Schafer, M. P., .Moss, G., **Hernandez., M.**, and Miller S. (2005) Impact of Environmental Factors on Efficacy of Upper-Room Air Ultraviolet Germicidal Irradiation for Inactivating Airborne Mycobacteria, *Environmental Science and Technology*, **39**: 9656.

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Kujundzic, E., Angenent, L., Zander, D., Henderson, D., Miller, S.L., and **Hernandez, M** (2005) Effects of Hybrid HEPA-UV on Airborne Bacteria Concentrations in an Indoor Therapy Pool Building. *J. Air and Waste Management Association.* **55:**210

Bilgin, A., Silverstein, J. and **Hernandez, M.** (2005) Effects of Soluble Ferri-Hydroxides on the Neutralization of Acid Mine Drainage, *Environmental Science and Technology* 39:7826-7832.

Peccia J. and **Hernandez M**. (2004) UV-induced inactivation rates for airborne *Mycobacterium bovis* BCG. *Journal of Occupational and Environmental Hygiene.* **1**:430.

Xu, P., J. Peccia, M P. Fabian, A. Barker, J. Martyny, K. Fennelly, **Hernandez., M**., and S. L. Miller. (2003) Inactivation of Bacteria and *Mycobacteria* Using Ultraviolet Germicidal Irradiation of Upper-Room Air *Atmsopheric Environment*. **37**(3):405

Gruden, C. L., Abu-Dalo, M., Fevig, S. and **Hernandez, M**. (2003) CTC (5-cyano-2,3-ditolyl tetrazolium chloride) reduction in mesophilic anaerobic digesters: measuring redox behavior, differentiating abiotic reduction, and comparing FISH response as an activity indicator. *Journal of Microbiological Methods*, **52**(1):59

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**Principal Advisor to Graduate Students and Post-Doctoral Researchers (chronological order)**

I have focused my mentoring on retaining graduate talent from socioeconomic groups that have been traditionally underrepresented in engineering education, or are otherwise disabled. Out of a total of 36 mentees, the pool of graduate students and post-doctoral fellows that I have formally mentored as a primary advisor includes women (67 %), and underrepresented students (45%). Of these, 6 are tenured engineering faculty at the following institutions: **Yale, Cornell, Boston University, U New Hampshire, Jordan University of Science and Technology, Shanghai Pudong University** and two are assistant professors at the following institutions: **University of British Columbia and University of Massachusetts.**

***Denotes student with physical disability; †Denotes student from a socioeconomic/ethnic group that is traditionally underrepresented in graduate sciences / engineering; ¥ Denotes first generation college student**

†**Cecilia Pennarieta**, (*Private Engineering Practice*), MS Environmental Engineering, May 1998
Thesis Topic: Denitrification in Aquifers Contaminated with Secondary Effluent

†**Cyndee Gruden**, (*Dean, The University of New Hampshire*), PhD, Environmental Engineering, Dec 2000
Dissertation Topic: Fate and Toxicity of Aircraft Deicing Fluid Additives through Anaerobic Digestion

Jordan Peccia, (*Professor, Yale University*), PhD, Environmental Engineering, Dec 2000
Dissertation Topic: Stability and Photoreactivation of UV-Irradiated Bioaerosols

†**Patricia Fabian**, (*Associate Professor, Boston University*), MS Environmental Engineering, Dec 2000
Thesis Topic: Total and Culturable Bacteria and Fungi in Arid Region Flood-Damaged Residences

¥**Colonel Jeff Cornell**, *(Chief, Environmental Programs, USAF, The Pentagon (ret.)*), PhD Environmental Engineering, 2001
Dissertation Topic: Environmental Fate of Benzotriazole-Based Corrosion Inhibitors

Cristina Fonseca, (*Private Engineering Practice, Carrollo Engineers)* PhD Environmental Engineering, August 2002
Dissertation Topic: Factors affecting biofouling of water treatment membranes and in-situ biofilm detection

†**Lieutenant Colonel Ivette O'Brien**, (*Chief of Engineering, Iraq, USAF (ret.)*), PhD Environmental Engineering, Dec 2002
Dissertation Topic: Uncoupling Behavior of Benzotriazole-Based Corrosion Inhibitors under Anoxic Conditions

Muna Abu-Dalo, (*Professor, Jordan University of Science and Tech.*) PhD Environmental Engineering, May 2003
Dissertation Topic: Effects of Functional Substitutions on the Biodegradability of Benzotriazole Derivatives

Largus Angenent, ( *Professor, Cornell University, Tuebingin, Germany*) Post-Doctoral Researcher, Tenure '00-03 Topic:
Molecular Characterizations of Microbiological Agents Suspended in Aerosols

Sarahann Dow, (*Private Engineering Practice, Brown and Caldwell*) PhD Environmental Engineering, Dec 2003
Dissertation Topic: Effect of water quality parameters on the ozone-inactivation of emerging pathogens

***Lisa Clarke,** (*Public Service: Colorado State Dept. of Public Health*) MS Environmental Engineering, May 2004
Thesis Topic: Biopolymer Characterization of the Organic Fractions of Airborne Particulate Matter

Jianxin Li, (*Associate Professor, Shantou University, PR China)* Post-Doctoral Researcher, Tenure 2002-2004
Research Topic: Acoustic Monitoring of Biofilms on Operating Water Treatment Membranes

¥**Emily Evans**, (*Private Engineering Practice, Brown and Caldwell*) MS Environmental Engineering, August 2005
Thesis Topic: Acoustic Monitoring of Biofilms on Operating Water Treatment Membranes

Zwien Yuan, PhD, *(Associate Professor, Shanghai University, PR China)*, Post-Doctoral Research Tenure, 2005-2007,
Research Topic: Enhancing Heavy Metal Removal from Acidic Industrial Waste Streams

Elmira Kujundzic, (*High School Chemistry Teacher*) PhD Environmental Engineering, August, 2005
Dissertation Topic: Effects of engineering controls on airborne fungal spores and microbial toxins

†**Mari Rodriguez**, (*Senior Scientist, Danish Technical University*) PhD Environmental Engineering, Dec 2009
Dissertation Topic: Molecular Ecology of Bioaerosols and Partitioning Behavior from Aquatic Sources

***Svetlana Nevostrueva**, (*Lead Engineer, Intel Corporation)* PhD Environmental Engineering, Dec 2009
Dissertation Topic: Immobilization of Heavy Metals using GAC impregnated with benzotriazoles

Elmira Kujundzic, (*High School Chemistry Teacher*) PhD, University of Colorado, Post-Doctoral Research Tenure, '06-10
Research Topic: Modeling and Acoustic Recognition of Biofouling Mechanisms

Kevin McCabe PhD, *(Brewmaster, Full Sail Brewery )* Oregon Graduate Institute, Post-Doctoral Tenure, '07-12
Research Topic: Mechanisms of Electrostatic Inactivation of Microorganisms

Alina Handorean PhD, *(Teaching Professor, Colorado School of Mines)* Washington University, Post-Doctoral Post-Doctoral Tenure, '09-13 Research Topic: Characterization of Biopolymers in Airborne Particulate Matter

Benjamin Miller, MS, (*Private Engineering Practice, Black and Veach Engineering)* Environmental Engineering, 2013
Research Topic: Reuse of Sugar Cane Bagasse for the Biological Remediation of Acid Mine Drainage

Alison Ling, PhD, (*Private Engineering Practice, Barr Engineers)* Environmental Engineering, Dec, 2013
Research Topic: Source Apportionment, Ecology and Inhibition of Microbially Induced Concrete Corrosion

†**Akua Fordjour** PhD, MD, (*Private Medical Practice)* Brown University, Post-Doctoral Research Tenure, '10 –11
Research Topic: Effects of Magnetic Fields on Cellular Membrane Functions

Bharath Prithiviraj, PhD, (*Senior Scientist, Reckitt Benckiser)* India Institute of Technology, Post-Doctoral Tenure, '11-13
Research Topic: Bioinformatics of Bioaerosols

Jane Turner PhD, (*Civil Engineer, City of Longmont)* Environmental Engineering, August 2014
Research Topic: Characterization and Control of Bioaerosol Toxicology

†**Odessa Gomez, PhD**, (*Chief Scientist, DetectionTek Corporation*) Environmental Engineering, Dec 2016
Research Topic: Effects of Natural and Engineered Weathering on Bioaerosols

†**Joan Marcano, PhD,** (*Director's Post Doctoral Fellow, National Renewable Energy Lab*), Post-Doctoral Tenure, '16-17
Research Topic: Bioaerosol Exposure in Public Schools

†**Alejandro Caicedo Ramirez**, (Private Engineering Practice) PhD, Environmental Engineering, May 2018
Research Topic: Upcycling Heavy Metals for the *in-situ* Control of Biogenic Concrete Corrosion

†**Ismael Justo Reinoso**, PhD, (Jr. Scientist, Bath University), PhD, Civil Engineering, Dec 2018
Research Topic: Behavior of Novel Cement Formulations for Microbially Induced Corrosion Control

†**Marina Nieto Caballero**, PhD, (Post-Doctoral Fellow, Colorado State University), Environmental Engineering, Aug 2021
Research Topic: High Fidelity Recovery of Airborne Microbial Genomic Materials

Emmalee Joy Biesiada, PhD Candidate, Environmental Engineering, Anticipated Graduation, Dec 2022
Research Topic: Peroxide Enhanced Bioaerosol Disinfection for HVAC and Occupational Settings

†**Nicollette Laroco**, PhD Candidate, Environmental Engineering (Fulbright Fellow), Anticipated Graduation, May 2022
Research Topic: Biogas purification with Activated Industrial By-Products

Yun Lu, MS, Environmental Engineering, May, 2021
Research Topic: Characterization of Airborne Surface Active Agents in the Built Environment

Sara Elizabeth Beck, PhD, (Assistant Professor, University of British Columbia), Visiting Scholar, 2020,
Research Topic: Effect of weak electromagnetic fields on microbiological system growth.

†**Mariana Lopes**, PhD, (Assistant Professor, University of Massachusetts, Amherst), Post-Doctoral Tenure, Summer 2020
Research Topic: Survival of Coronavirus in HVAC filter media

†**Eddie Fuques Villalba, MS**, Molecular Biology, 2020, Visiting Scholar, AY 2020
Research Topic: Occurrence and persistence of airborne mammalian viruses

Sahithi Kandala, PhD (Post-Doctoral Fellow, IIT Hydrabad India), Co-advised with Electrical Engineering, May 2021
Research Topic: Effects of weak magnetic fields on (micro)biological systems

Emily Antionette Kraus, PhD Environmental Engineering, Colorado School of Mines, Post-Doctoral Tenure, 2021-2025
Research Topic: Metagenomic characterizations of airborne microbe response to disinfectants

Heather Runberg, PhD Chemistry, University of Denver, Post-Doctoral Tenure, 2022-2024
Research Topic: Characterization of Airborne Surfactant Pools in the Built Environment

Erik Huynh, MS Candidate, Environmental Engineering, Anticipated Graduation 2024
Research Topic: Optimization and Life Cycle Analysis of Steel Making Residuals for the Reclamation of Biogas

Nasim Ildiri, PhD Candidate, Environmental Engineering, Anticipated Graduation 2026,
Research Topic: Energy and Exposure Reductions of Medium-Occupancy Buildings following Building Hygiene

Tess Eidem, PhD, PhD Microbiology, University of Nebraska, Post-Doctoral Tenure, 2023-2026
Research Topic: Denaturing airborne allergens

Dorian Swartz, PhD Candidate, Environmental Engineering, Anticipated Graduation 2027,
Research Topic: Fluorescence Induced Reciprocal Nephelometry for Bioaerosol Characterization

Kristin Rugh, PhD Candidate, Co advisory, Biochemistry, Anticipated Graduation 2028
Research Topic: Mechanisms of Airborne Allergen Denaturing with Short Wavelength UVC

## ***Principal Advisor to Undergraduate Students for Research Experiences and Independent Study***

In addition to serving as a principal advisor to graduate students, I have, where appropriate, included undergraduate students as active participants in sponsored research projects. These students have been supported for laboratory appointments using supplements from an NSF CAREER award, an NSF REU site award, the University of Colorado's Undergraduate Research Opportunities Programs (UROP), as well as our Summer Multicultural Access to Research Training (SMART) program. I have focused undergraduate recruiting efforts on disabled students, and those from socioeconomic groups that have been traditionally underrepresented in engineering education. Undergraduates participating in my laboratory typically receive intensive analytical training, followed by a "stand-alone" project that supports a larger research effort. Of the undergraduates that have participated in sponsored research, ten have, or soon will be, co-authors on archival publications. Out of a total of 42 students, the pool of undergraduates that I have formally mentored as an internship advisor now includes women (78%), and underrepresented students (> 60%). Of these, more than half have gone on to complete a STEM graduate degree.
***Denotes student with physical disability; †Denotes US citizen from a socioeconomic/ethnic group that is traditionally underrepresented in graduate sciences / engineering**

Holly Marie Werth, Summer and AY Research 1999
*Water Vapor Sorption by Bioaerosols*

†**Stephanie Fevig**, Summer Research 1999
*Anaerobic Stability of Tetrazolium Dyes*

Sarahann Marie Dow, Summer and AY Research 1999
*Anaerobic Toxicity Assays in Mesophilic Systems*

†**Rousaura Andujar-Nieves**, Summer Research 2000
*Stability of Aqueous Ozone*

†**Susan Bautts**, Summer and AY Research 2000, 2003
*Gene Probing Acid Tolerant Sulfate-Reducing Bacteria*

Heather Leifeste, Summer Research 2000
*Calibrating Acoustic Microscopes on Biofilms*

Siri Nelson, Summer Research 2000
*Sulfate Reduction in Deicer Contaminated Soils*

***Lisa Clarke**, Summer Research 2001
*Measuring Biological Particles in Urban Air*

David Zander, Summer and AY Research 2002
*Immune/Gene Probing of Mycobacteria in Pools*

Emily Evans, Summer Research 2002
*Acoustic Biomass Detection*

Erin Gunderson, Summer and AY 2002-03
*Measuring Extremely Low Biomass Levels*

Geoff Lively, Summer and AY Research 2001
*Ozone-Inactivation of Bacterial Spores*

Nathan Heick, Summer 2001 and AY 2002-03
*Polargraphic Detection of Benzotriazoles*

***Lisa Clark**, AY 2001
*Primary Biological Materials in Urban Air*

Emily Evans, AY 2003
*Monochloramine Inactivation of Viruses*

Dani Cedars, AY 2001
*Pure culture degradation of Deicing Agents*

Cheryl Horn*,* Summer 2003
*Sorption behavior of Benzotriazoles*

Jennifer Jeffers, Summer Research 2004
*Engineering Controls for Bioaerosols*

Emily Heller*,* Summer 2003 and AY 2003
*Carbohydrate Measurements in Aerosols*

Sharon Shearer, Summer 2003
*UV Inactivation of Airborne Fungal Spores*

†**Mariela de Jesus Encarnación,** Summer 2005
Characterization of sessile biogenic acid production

†**Joan Marcano**, Summer 2005
Electric field disinfection of bioaerosols

† **Yaidi Cancel Martinez**, Summer 2006
*UV Effects on Quantitative PCR*

† **Brandon Carter**, Summer 2007
*Bioaerosol Ecology in Flooded New Orleans homes*

Emily Sheehan , Summer 2008
*Genetic Profiling during Microbial Disinfection*

† **Danielle Griego**, AY 2008
*Water Feature Operational Impacts on Indoor Air*

† **Ivan Albino**, Summer 2009
*Development of an Intercellular Thermometer*

† **Angela Uribe** , Summer 2009
*Performance of Antimicrobial Coatings*

† **Daniella Castañeda** , AY 2010
*Disinfection of Viral Aerosols*

† **Nicole Seminara** , AY 2010
*Removal of Heavy Metals from Industrial Wastes*

† **Natalia Vazquez Rivera** , Summer 2010
*Biopolymer Composition of Pristine Aerosols*

† **Luis Lazio del Sol** , Summer 2010
*Effects of Weak Magnetic Fields on Cell Grow*

Paige Prusner , AY 2010, 2011
*Biopolymer Composition of Aerosols*

Diedra Gustavson , AY 2010, 2011
*Filter Disinfection of Model Bioaerosols*

† **Wilmare Marero** , Summer 2011
*Biopolymer Composition of Urban Aerosols*

† **Lizette Castillo** , Summer 2012
*Biopolymer Composition of Wildfire Aerosols*

† **Jordan Estrada** , Summer 2014
*Aging of Biopolymers in Aerosols*

† **Rogelio Lasaro Hernandez** , AY 2016
*Occurrence of VOCs in K-12 classrooms*

† **Renzo Conroy Cueva**, AY 2016
*CO and $CO_2$ in K-12 Classrooms*

† **Ruben Vega,** AY 2016
*Ozone and Formaldehyde in K-12 Classrooms*

† **Priscilla Jimenez**, AY 2017
*Aging of Biopolymers in Aerosols*

**Ben Posthumus**, Summer 2019
*DNA Extraction from low biomass aerosols*

† **Halle Sago**, Summer/AY 2020-21
*Indoor Air Quality in K-12 Schools*

† **Sylvia Akol**, Summer/AY 2020-21
*Indoor Air Quality in K-12 Schools*

**Christiane Nitcheu,** *2020,*
*Indoor Air Quality in K-12 Schools*

† **Jeronimo Luna**, Summer/AY 2020-21
*Indoor Air Quality in K-12 Schools*

† **Ximena Ibarra**, Summer/AY 2020-21
*Indoor Air Quality in K-12 Schools*

† **Ariana Carmody**, Summer 2021
Chlorine assessment of indoor air

† **Emily Stamos**, 2021-2024,
EMF inactivation of biofilms

† **Sam Bryan**, 2021-2024
UV inactivation of airborne viruses

Claire Darley, 2022,
*Indoor Air Quality in K-12 Schools*

† **Darian Payan**, 2022
*Indoor Air Quality in K-12 Schools*

† **Ari Quezada**, 2024
*Indoor Air Quality in K-12 Schools*

Katie Waggy, 2024,
*Indoor Air Quality in K-12 Schools*

† **Cindy Vallejos**, 2024,
*Indoor Air Quality in K-12 Schools*

Keegan Nagel, 2022-2024,
*Indoor Air Quality in K-12 Schools*

† **Nathaniel Ramirez**, 2022-2024,
*Indoor Air Quality in K12 Schools*

† **Isaac Chavarria**, 2022-2024,
*Indoor Air Quality in K-12 Schools*

Kristina Petrov, 2023-2024,
*Indoor Air Quality in K-12 Schools*

† **Alex Gomez**, 2024,
*Indoor Air Quality in K-12 Schools*

† **Maria Rodriguez**, 2023-2024,
*Indoor Air Quality in K-12 Schools*

† **Andrew McCoy**, 2024,
*Indoor Air Quality in K-12 Schools*

Michael Gentry, 2024,
*Indoor Air Quality in K-12 Schools*

Dylan Lawson, 2024
*Indoor Air Quality in K-12 Schools*

Daniel Sink, 2024,
*Indoor Air Quality in K-12 Schools*

Fatih Arslan, 2024,
*Indoor Air Quality in K-12 Schools*

Ruby Carman Frank, 2024
*Indoor Air Quality in K-12 Schools*

† **Isaac Claudio,** 2024
*Indoor Air Quality in K-12 Schools*

## SERVICE ACTIVITIES

In addition to serving as a principal advisor to more than 36 graduate students and post-doctoral researchers, I have served on more than 100 graduate students' research advisory/examination committees; these include students from Engineering, Psychology, and the University of Colorado Health Sciences Graduate School (Public Health).

**Department of Civil, Environmental and Architectural Engineering, University of Colorado**

Curriculum Committee, 2000 - 2014 Graduate Admissions Committee, 1997 – 2000, 2003 – 2005, 2017-2018
Environmental Engineering Undergraduate Program Advisory Committee, 1998 - 2018
Senior Faculty Search Committees 1999, 2001, 2005, 2006, 2009, 2014, 2017, 2018, 2019
Executive Committee 2021-present

**College of Engineering and Applied Sciences, University of Colorado**

High School Honors Outreach Program**,** Coordinator for Undergraduate Environmental Engineering Programs, 2001 - 2006

College Committee on Bioengineering, 1999 - 2003 Dean's Strategic Planning Committee, 1999

**National Science Foundation and American Association for Advancement of Science, Proposal Panel Review Member**:
Engineering Directorate, Bioenvironmental Engineering Sciences and Environmental Technology (2003, 2005, 2007, 2104)
Faculty CAREER Development Awards (1999, 2002, 2003, 2004, 2005, 2006, 2009)
Small Business Innovation Grants (1998, 2004, 2009)
Alliance for Graduate Education and the Professorate (2004, 2005, 2007)
Presidential Mentoring Award (2005, 2006, 2008, 2011)
Historically Black Colleges and Universities (2009, 2010, 2011)
International Programs (2010 and 2011)

**Peer Reviewer for Recent Publications in the Following Archival Journals**:
*Aerosol Science and Technology* *Journal of Aerosol Science*

*Water Environment Research*
*Environmental Science and Technology*
*Environmental Engineering Science*
*Applied and Environmental Microbiology*
*Nature*
*Water Research*
*Journal of the Air and Waste Management Association*
*ASCE Journal of Environmental Engineering*
*Journal of Aerosol Science*
*PNAS*

## PRINCIPAL COURSEWORK INSTRUCTOR

- *CVEN 3414 Fundamentals of Environmental Engineering*, (18 semesters) service undergraduate lecture course
- *CVEN 4484 Applied Environmental Microbiology,* (24 semesters) advanced undergraduate lecture course
- *CVEN 5484 Advanced Environmental Microbiology*, (12 semesters) graduate lecture and projects course
- *AREN 2110 Thermodynamics* (32 semesters) service undergraduate lecture course
- *CVEN 4654 Environmental Engineering Processes (1 Semester), service level upper division lecture course*
- *GEEN 1400 Freshman Projects* (2 semesters), introduction to engineering culture and design
- EVEN 3550 Sustainability Principles (2 Semesters) introduction to sustainability and life cycle analyses