

James Harper, PhD, PE

Researcher, Educator, Engineer

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Summary

Expert in rural water and sanitation systems in low-resource contexts, particularly in Southeast Asia, including all stages of conceptualization, design, construction, testing, monitoring, evaluation, systems interactions, and research

Engineer with 14 years engineering design and project management experience in civil, mechanical and energy projects, particularly in rural low-resource contexts

Educator with 9 years teaching experience at the graduate, undergraduate and high-school levels in international development, project-based engineering, and computer programming; and at the high-school level in math, physics, chemistry, English, Spanish, writing and music

Researcher with 9 years experience in basic human needs, including sanitation, water, nutrition, and menstrual health, using quantitative and qualitative methods, and expert in study design; survey and interview guide development; data analysis; reporting; and presenting

PhD & MS in Civil Systems Engineering from the University of Colorado Boulder with specializations in global engineering, rural sanitation, decision-making, willingness to pay, and systems thinking

MS & BS in Mechanical Engineering (summa cum laude) from the University of California, San Diego with specializations in computer-aided design and analysis, and distributed renewable power production

Expert in science communication, knowledge transfer and outreach

Expert editor of content and English in scientific writing with 10 years experience and specialties in engineering and critical care medicine

Advocate for open-access publishing

Lifelong learner, educator of young minds with a focus on solving the world's toughest challenges, and advocate for a sustainable future for humanity

Research Highlights

- ❖ Designed and performed various quantitative and qualitative studies of fecal sludge management decision-making and practices in rural low-resource communities in Southeast Asia, including 2000+ households and 42 pit-emptying entrepreneurs
- ❖ Developed, administered, and analyzed the data from a novel survey called The FSM Survey, which describes how rural households in low-resource contexts make decisions about fecal sludge management
- ❖ Published various documents and presented research findings and recommendations in various peer-reviewed and non-peer-reviewed fora both domestically and internationally

Engineering Highlights

- ❖ Extensive experience with practical sanitation, water treatment and renewable energy systems in rural low-income communities
- ❖ Innovative, insightful and professional project management skills with a proven ability to solve problems working in international, multidisciplinary teams
- ❖ Expert in SolidWorks, R, Python, MS Excel, and MATLAB; experienced in Pro/ENGINEER, Visual Basic, C++, Simulink, EnergyPlus
- ❖ Excellent interpersonal and presentation skills, especially in high-pressure situations

Teaching Highlights

- ❖ Specialized in teaching project-based engineering and computer programming, students with learning disabilities, and English as a second language
- ❖ Effectively communicate technical information to non-technical audiences, improvising curricula and style to meet diverse student learning requirements
- ❖ Student and parent satisfaction rates above 94%, particularly due to adaptive teaching style that promotes student self-reliance and creativity

Other Highlights

- ❖ Emergency medical technician with speciality in wilderness contexts; mountain rescue operation leader and instructor; ski patroller; and trainee fighter
- ❖ Edited 1600+ scientific articles written by international authors at 4000+ words per hour, and reviewed 100+ scientific articles and condensed reports for content

Experience

Research

- ❖ Evaluating the impact of a menstrual health intervention in urban Ethiopia
- ❖ Describing sanitation; water access and treatment; hygiene; nutrition; menstrual health; housing; and power product systems in various communities around the world using both qualitative and quantitative methods as a freelance consulting researcher
- ❖ Converting white papers to journal articles for development organizations that seek to widen the impact and accessibility of their research
- ❖ Designed and performed various studies of fecal sludge management decision-making and practices in rural low-resource communities in Southeast Asia
 - Cross-sectional mixed-methods study of pathogen degradation in real-world alternating dual-pit latrines in 150 households and related sanitation behaviors in 1450 households in Cambodia
 - Cluster-randomized quantitative study of 1472 households in Cambodia

- Cross-sectional qualitative study of 56 households and 42 pit-emptying entrepreneurs in Bangladesh
- Pre-post controlled intervention study of 832 households in Cambodia
- Cross-sectional qualitative study of 5 households in Cambodia
- ❖ Developed The FSM Survey to describe how rural households in low-resource contexts make decisions about fecal sludge management
- ❖ Helped develop the [National Fecal Sludge Management Guidelines for Rural Households](#) published by the national Cambodian government in Mar 2020
- ❖ Consulted on various sanitation-, water- and cookstove-related studies and development projects around the world with various organizations, including iDE, East Meets West, SOIL, and WaterAid
- ❖ Reviewed and summarized all evidence-based findings about rural fecal sludge management in Cambodia
- ❖ Surveyed 100+ households in rural Andhra Pradesh, India to evaluate community capacity and design requirements for community-based water treatment system
- ❖ Spoke on and moderated many panels about global engineering at conferences and in high-school, undergraduate and graduate courses
- ❖ Praised by various reviewers for writing clarity, study novelty, and scientific rigor
- ❖ Invited speaker on panel about open-access academic publishing at the University of Colorado Boulder in Oct 2020

Civil Engineering

- ❖ Researched how decision-making interacts with fecal sludge management in rural low-resource communities of Cambodia and Bangladesh in partnership with various organizations using quantitative, qualitative, and mixed methods
- ❖ Managed, designed, constructing, and providing maintenance support for two community-scale RO water treatment systems; 32 earthquake-resistant houses with rainwater catchment and latrines; and a 5.4-kW solar photovoltaic system with 2 days of battery backup in rural Andhra Pradesh, India as part of a multinational engineering team
- ❖ Replaced projects' Lead Engineer on short notice and saved \$20,000 of grant funding from being lost, increasing clean-water production capacity by 300%

Mechanical Engineering

- ❖ Led team of four engineers through the design, construction, testing and user training of a prototype sensing device that improved medical laser effectiveness by 172% and reduced training time by 60%
- ❖ Designed and tested off-grid solar building with decision-making energy-usage software that considered forecasted weather

- ❖ Designed and tested ruggedized mobile satellite communication devices for increased durability and reduced weight
- ❖ Designed and tested high-power laser devices for semiconductor lithography manufacturing processes, reducing thermal loading and equipment cost while increasing product output of high-power laser ablation process by 11%
- ❖ Designed and tested ultra-low tolerance composite form tools and processes for many composite aviation products that increased yearly production output by 23% while reducing labor costs by 30%
- ❖ Designed, prototyped and tested multiple airborne infrared countermeasure systems with fast-switching mirror assemblies that maximized laser output and duration while minimizing weight and power usage
- ❖ Designed and tested landing-gear emergency deploy system, and wing and tail control linkages for Predator C aircraft that reduced weight by 63 lbs. while improving performance and safety
- ❖ Designed new load restraint system for road transportation of >10 ton steel coils that reduced transportation time by 3%, yearly operator injuries by 15%, and load case processing time by 10,000x
- ❖ Increased productivity of aerospace firm's engineering management by 19% in 1 month by streamlining quality control processes and providing project cost analysis and design advice

Teaching

- ❖ Currently teaching the following at the University of Colorado Boulder...
 - Graduate, senior, and freshman engineering design in project-based courses
 - Monitoring and evaluation of development projects as a graduate-level course
 - Qualitative analysis methods as a graduate-level short course and workshop
- ❖ Developed and co-taught global engineering at the graduate level at the University of Colorado Boulder
- ❖ Revised the graduate curriculum for the Global Engineering program with faculty at the University of Colorado Boulder
- ❖ Taught computer programming in Python to graduate-level bioinformatics students at San Diego State University in California
- ❖ Taught seven courses in engineering design and analysis; computer programming; math; and machine shop at the undergraduate level to 100+ students at the University of California San Diego
- ❖ Guest-lectured and worked as a teaching assistant in many undergraduate and graduate courses

- ❖ Taught twenty-four courses in project-based engineering, computer programming, math, physics, chemistry, English, Spanish, writing and music at the high school level to 300+ students in California
 - In one of my project-based engineering classes, students designed, built and maintained an Earth Bench using non-recyclable trash; built and maintained an Internet-connected weather station; and designed, built and maintained a computer sensing system for a salt-water aquarium containing endangered sea bass.
- ❖ Developed multiple departments' curricula for engineering, computer programming, math, physics and chemistry classes including lesson plans, laboratory experiments and field trips to local industries
- ❖ Tutored 50+ underprivileged K-12 home- and traditionally-schooled students in all levels of English, math, Spanish, physics, chemistry and biology
- ❖ Specialized in teaching students with learning disabilities and English as a second language using custom curricula
- ❖ Organized school-wide science fair and mentored 14 students through individual projects focused on global sustainability and engineering
- ❖ Advised various student groups on concept and design of infrastructure development projects, including energy production and water treatment systems, for [World Affairs Challenge](#)
- ❖ Taught and developed curricula for technical rope rescue, search tactics, wilderness medicine, navigation methods, backpacking techniques, and safety standards for the 70 people on the San Diego Mountain Rescue Team
- ❖ Took charge of ten full-time high school classes midway through first semester when prior teacher suddenly quit
- ❖ Co-taught 5th-grade physics, mathematics and chemistry; developed lesson plans, homework and tests
- ❖ Taught after-school classes in basic and advanced computer use to 7th-grade students, focusing on Windows, Microsoft Office, and how to build and network computers
- ❖ Praised by students, colleagues, and managers
 - “James ensures that students know everything about a subject before they leave the classroom”, “encourages discussion and listens to the different perspectives of everyone in the class”, and is “always willing to help a student”. - Students from my classes at the University of Colorado Boulder
 - “James is a natural teacher that inspires his students with his approachable enthusiasm and very positive attitude.” - Head of School of High Bluff Academy in Del Mar, CA
 - Students rated my teaching 4.7 out of 5 across my classes at High Bluff Academy in Del Mar, CA and at the University of Colorado Boulder

Other

- ❖ Emergency medical technician with speciality in wilderness contexts; mountain rescue operation leader and instructor; ski patroller; and trainee fighter
- ❖ Edited 1600+ academic articles written by international authors at 4000+ words per hour
 - Subject expert in civil engineering, mechanical engineering, behavioral science, and critical care medicine

Work History

Research

- ❖ Research Manager, Educator and Engineer, **Noble Pursuits, LLC** 2016 - Present
 - Expert in rural water and sanitation systems; housing construction, including earthquake-resistant design; and electricity production, particularly via solar and wind, in low-resource contexts, particularly in Southeast Asia and Africa
 - Experienced with nutrition, breastfeeding, and menstrual health
 - Specialties in...
 - Systems thinking and analysis, including cause-effect relationships between infrastructure and social systems
 - Measuring individual or household willingness to pay for a product/service, particularly using discrete choice experiments
 - Survey and interview guide development
 - Decision-making and behavior, and describing relevant influencing factors
 - Simplifying academic writing into easy-to-understand text without losing specificity using theories of science communication and knowledge transfer

Engineering

- ❖ Lead Engineer of India Program, **Engineers Without Borders USA** 2012 - Present
- ❖ Engineer I, **Quartus Engineering** 2010 - 2012
- ❖ Engineer II, **General Atomics Aeronautical Systems, Inc.** 2009
- ❖ Engineering Intern, **Applied Research Associates** 2008 - 2009
- ❖ Lead Engineer, **Photothera** 2008
- ❖ Engineer I, **New Zealand Steel** 2007 - 2008
- ❖ Research Assistant, **Centre of Excellence for Advanced Materials** 2007
- ❖ Engineering Intern, **Hamilton Sundstrand** 2005

Teaching

- ❖ Professor of Engineering Design, **University of Colorado Boulder** 2023 - Present
- ❖ Instructor, **University of Colorado Boulder** 2019 - 2023
- ❖ Teaching Assistant, **University of Colorado Boulder** 2016 - 2017
- ❖ Instructor, **San Diego State University** 2015
- ❖ STEM Teacher, **various high schools in California** 2012 - 2016
- ❖ Instructor of Search and Rescue, **San Diego Mountain Rescue Team** 2010 - 2016
- ❖ Academic Tutor, **Various organizations in California** 2004 - 2015
- ❖ Teaching Assistant, **University of California San Diego** 2009
- ❖ Teacher, **Spreckels Elementary School** 2007 - 2009
- ❖ Teacher, **City of Gilroy Computer Education Program** 2002

Other

- ❖ Firefighter EMT, **Timberline Fire Protection District** 2022 - Present
- ❖ Senior Editor, **American Journal Experts** 2014 - Present
- ❖ Emergency Medical Technician, **Riley Care Ambulance** 2015

Education

PhD, Civil Systems Engineering (4.0 GPA), **University of Colorado, Boulder** 2020

- ❖ Specializations in global engineering, rural sanitation, decision-making, willingness to pay, and systems thinking
- ❖ Dissertation titled "Fecal Sludge Management in Rural Low-resource Contexts: Understanding Decision-making by Households in Cambodia"

MS, Civil Engineering (4.0 GPA), **University of Colorado, Boulder** 2018

MS, Mechanical Engineering (4.0 GPA), **University of California, San Diego** 2010

- ❖ Specializations in computer-aided design and analysis, and distributed power production
- ❖ Thesis titled "Statistical analysis of solar irradiation in a distributed microgrid"

BS, Mechanical Engineering (3.98 GPA), **University of California, San Diego** 2008

- ❖ Summa cum laude

Publications

Abdel Sattar, R., Rogla, J., Veasna, T., Kozole, T., Nicoletti, C., & **Harper, J.** (2023) Effects of climate vulnerability on household sanitation access, functionality and practices in rural Cambodia. Preprint available at <https://osf.io/vxtka/>. Submitted for publication to Environment, Development, and Sustainability. Currently under review.

Harper, J., Abdel-Sattar, R., Kozole, T., Veasna, T., Rogla, J., Ross, M., Ives, N., Pruitt, H., Soneja, P., & Capone, D. (2023). Household Perceptions, Practices, and Experiences with Real-world Alternating Dual-Pit Latrines Treated with Storage and Lime in Rural Cambodia. Preprint available at <https://osf.io/e8q4k/>. Submitted for publication to the Journal for Humanitarian Engineering.

Harper, J., Abdel-Sattar, R., Kozole, T., Veasna, T., Rogla, J., Ross, M., Ives, N., Pruitt, H., Soneja, P., & Capone, D. (2023). Microbial Hazards in Real-world Alternating Dual-Pit Latrines Treated with Storage and Lime in Rural Cambodia. Preprint available. Submitted for publication to the Journal for Water, Sanitation, and Hygiene for Development.

Kirsch, K., Nagel, C., Iribagiza, C., Ecklu, J., Zawadi, G., Ntabaza, P., Barstow, C., Lund, A. **Harper, J.**, Carlton, E., Javernick-Will, A., Linden, K., & Thomas, E. (2023). Study design and baseline to evaluate water service provision among peri-urban communities in Kasai Oriental, Democratic Republic of the Congo. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0283019>

Nicoletti, C., Lestikow, G., Veasna, T., May, A., Macaranas, R., Hudner, D. & **Harper, J.** (2022) Increasing latrine sales among poor households in rural Cambodia using targeted subsidies: a randomized control trial. *Journal of Water, Sanitation and Hygiene for Development* 1 November 2022; 12 (11): 782–791. doi: <https://doi.org/10.2166/washdev.2022.184>

Harper, J., Chem, P., Bunthoeun, I., Sekheng, S., Hor, K., & Pham, L. (2022). Household Perceptions of Fecal Sludge Management and Demand for Safely Managed Sanitation in Two Rural Cambodian Communities. Manuscript in preparation.

Harper, J., Bielefeldt, A., Javernick-Will, A., Veasna, T., Kozole, T., & Nicoletti, C. (2022). Household Acceptance of Safe Fecal Sludge Management Practices in Rural Cambodia. Manuscript in preparation.

Moung, V., Saypheararak, M., & **Harper, J.** (2021). Discrete Choice Model of Cookstove Attributes in Cambodia. <https://mecs.org.uk/wp-content/uploads/2021/12/Cambodia-Cookstove-Discrete-Choice-Modeling-Report.pdf>

Sokh, C., Zafar, S., Moung, V., **Harper, J.** (2021). Cooking Diaries of Cambodian Households. <https://mecs.org.uk/wp-content/uploads/2021/11/Cambodia-Cooking-Diaries-Study.pdf>

Thomas, E., Salvinelli, C., **Harper, J.**, MacDonald, L., Klees, R., Platais, G., Javernick-Will, A., & Linden, K. (2021). A Body of Knowledge and Pedagogy for Global Engineering. 16(1), 21. <https://ojs.library.queensu.ca/index.php/ijsle/article/view/14483>

Harper, J., Bielefeldt, A., Javernick-Will, A., Dickinson, K., Veasna, T., Kozole, T., & Nicoletti, C. (2021). Household preferences for rural fecal sludge management services in Cambodia: A discrete choice experiment. *Environmental Science & Technology*, 55(3), 1832–1841. <https://doi.org/10.1021/acs.est.0c04636>

Harper, J. (2020). Fecal Sludge Management in Rural Low-Resource Contexts: Understanding Decision-Making by Households in Cambodia. <https://www.proquest.com/openview/8b5e7fac974ed8c81911fd4b0ccdf007/1?pq-origsite=gscholar&cbl=51922&diss=y>

Harper, J., Bielefeldt, A., Javernick-Will, A., Veasna, T., & Nicoletti, C. (2020). Context and intentions: Practical associations for fecal sludge management in rural low-income Cambodia. *Journal of Water, Sanitation and Hygiene for Development*, 10(2), 191–201. <https://doi.org/10.2166/washdev.2020.103>

Harper, J. (2019). Fecal Sludge Management in Rural Low-income Cambodia: A review of current knowledge. <https://osf.io/7jk9d/>

Harper, J., Jordan, L., & Hollander, D. (2018). Lessons learned from a collective action approach to strengthen rural sanitation and hygiene in Cambodia. USAID.

Harper, J., Bielefeldt, A., Javernick-Will, A., & Veasna, T. (2018). Intentions Toward Fecal Sludge Management in Rural Developing Communities. Engineering Projects Organizations Conference (EPOC). Brijuni, Croatia. <https://bit.ly/2QeTucU>

Harper, J. (2010). Statistical analysis of solar irradiation in a distributed microgrid. UC San Diego: b6869039. Available online at <https://escholarship.org/uc/item/55d9380b>

Kleissl, J., **Harper, J.**, & Dominguez, A. (2010). A Solar Resource Measurement Network for Solar Intermittency at High Spatio-Temporal Resolution. Presented at the annual SOLAR conference in Phoenix, AZ, USA on 2010 May 17-22. Proceedings of the 39th American Solar Energy Society National Solar Conference. <http://goo.gl/ugN6Wv>

Presentations

Abdel Sattar, R., Nicoletti, C., Kozole, T., Veasna, T., & **Harper, J.** (2023). Effectiveness and Use of On-Site Safely Managed Sanitation Solutions in Rural Cambodia. Water and WASH Futures Conference.

Harper, J., & Abdel Sattar, R. (2022). Fecal Sludge Treatment Effectiveness and Use of Alternating Dual-Pit Latrines in Rural Cambodian Households. Presented at the WASH Symposium of the University of Colorado Boulder in March 2022. https://drive.google.com/file/d/1-Ypb0ynbykOFvCNiQ4gS_EM6byInGaKZ/view?usp=sharing

Moung, V., & **Harper, J.** (2022). Cookstove Discrete Choice Modeling in Rural Cambodia. Presented to Modern Energy Cooking Services (MECS) in Jan 2022. <https://docs.google.com/presentation/d/1YU0u1Nn3pUM30XMi0jQLgtoXbk2tQ7YYoEHOt-krm4/edit?usp=sharing>

Harper, J., & Nicoletti, C. (2021). Improving Customer Segmentation for WASH Marketing: Tools and Examples for Practitioners and Researchers. Presented at the Water and Health Conference at the University of North Carolina in Oct 2021. <https://docs.google.com/presentation/d/1VZ6KO1UQBmACDj6Jgt1I14Hs1GK4klru/edit?usp=sharing&oid=108881450120407164926&rtpof=true&sd=true>

Abdel Sattar, R., Nicoletti, C., Kozole, T., Veasna, T., & **Harper, J.** (2021). Linking Climate Vulnerability to Latrine Functionality and Fecal Sludge Management Practices in Rural Cambodia. FSM6. <https://bit.ly/3Rgkrf> and <https://abs.fsm6.org/absview?id=Nzg=>

Harper, J., Bielefeldt, A., Javernick-Will, A., Veasna, T., & Nicoletti, C. (2020). Acceptance of Safe Fecal Sludge Management Practices in Rural Cambodia. Presented at the Water and Health Conference at the University of North Carolina in Oct 2020.

<https://drive.google.com/file/d/1zrsOJ3DzhQ2ufWt4N9ueJW7-TNRHJ4Ag/view?usp=sharing>

Harper, J., Bielefeldt, A., Javernick-Will, A., Veasna, T., & Nicoletti, C. (2020). Household Preferences for Rural Fecal Sludge Management Service Attributes: A Discrete Choice Experiment. Presented at the WASH Symposium of the University of Colorado Boulder on 4 March 2020. <https://bit.ly/3dpyUD6> and <https://bit.ly/3ecY7ME>

Nicoletti, C. & **Harper, J.** (2019). Why We're Possibilists: FSM Edition. Presented at the Gates Foundation MEDS Conference in Siem Reap, Cambodia on 28 Oct 2019. <https://bit.ly/32ubYJ4>

Harper, J., Bielefeldt, A., Javernick-Will, Asaduzzaman, M., & Karki, S. (2019). Why Pit Emptiers in Rural Bangladesh Do What They Do: Decision-making in Fecal Sludge Management. Presented at the Water and Health Conference at the University of North Carolina on 8 Oct 2019 and at Research and Innovation Week at the University of Colorado Boulder on 17 Oct 2019 (1st Place in Poster Competition). <https://bit.ly/2RHPjXw>

Harper, J., Bielefeldt, A., Javernick-Will, Veasna, T., & Nicoletti, C. (2019). When Rural Latrine Pits Fill: Characterizing Household Choices and Encouraging Safe Fecal Sludge Management. Presented at the FSM5 Conference in Cape Town, South Africa on 20 Feb 2019.

<https://bit.ly/3gjEOiA> and <https://www.youtube.com/watch?v=x0QT40j0C08>

Harper, J., Bielefeldt, A., Javernick-Will, Veasna, T., & Nicoletti, C. (2018). What Are You Going To Do With All That Poo: FSM Decision-making in Rural Low-income Cambodia. Presented at the Water and Health Conference at the University of North Carolina on 31 Oct 2018.

<https://bit.ly/2QeZhz0>

Kozole, T., Veasna, T., & **Harper, J.** (2018). Learnings from Sanitation Marketing Scale Up Program (SMSU) 2.0. Presented to Cambodia Rural Sanitation and Hygiene (RuSH) Group on 31 Aug 2018. <https://bit.ly/3v3ISgV>

Harper, J. (2018). Why Global Engineering Matters. Presented at Mortenson Center for Global Engineering on 25 Jul, 2018.

Harper, J., Bielefeldt, A., Javernick-Will, A., & Veasna, T. (2018). Intentions Toward Fecal Sludge Management in Rural Developing Communities. Presented at the Engineering Projects Organizations Conference (EPOC) in Brijuni, Croatia on 25-27 June 2018.

<https://bit.ly/3mUEZHb>

Harper, J. (2018). Practical Coding in R for Researchers. Presented at the University of Colorado Boulder on 20 May 2018. <https://bit.ly/3edMxk7>

Harper, J., Bielefeldt, A., & Javernick-Will, A. (2018). Intentions Toward Fecal Sludge Management in Rural Developing Communities. Presented at the Metropolitan State University's Humanitarian Engineering Symposium in Denver, CO, USA on 20 Apr 2018.

<https://bit.ly/3eaexW7>

Harper, J. (2017). TEDx: The Human Side of Development. Presented at TEDxYorkSchool in Monterey, CA, USA on 15 Dec 2017. <https://www.youtube.com/watch?v=SrePeztynO4>

Harper, J. (2017). Evaluating and Modifying Behavior to Improve Sanitation Infrastructure Sustainability. Presented at the Symposium for Sustainable Infrastructure 2 at the University of Colorado Boulder on 4 Nov 2017. Received 3rd-place poster award. <https://bit.ly/3v04gCE> and <https://bit.ly/3uTmFkg>

Harper, J. (2017). Evaluating and Modifying Behavior to Improve Sanitation Infrastructure Sustainability. Presented at the WASH Symposium of the University of Colorado Boulder on 7 March 2017. <https://bit.ly/32q02bg>

Harper, J. (2015). Affordable Yet Sufficient: How to Ensure Economic Sustainability for Community-Driven Projects. Presented at the 2015 West Coast Regional Conference, Engineers Without Borders USA at the California Polytechnic State University in San Luis Obispo, CA, USA on 2015 November 15. Available at <https://bit.ly/32oXbPK> and https://www.youtube.com/watch?v=CFvY_yi9aNY

Harper, J. (2015). India Program: Chakicherla Pedda Patapu Palem and Narasapuram. Presented at the Engineers Without Borders-USA San Diego Professional Chapter 10-Year Anniversary Celebration in San Diego, CA, USA on 2015 August 27.

Harper, J. (2015). Engineers Without Borders India Water Purification and Solar Power Program. Presented at Mater Dei Science Academy in Chula Vista, CA, USA on 2015 February 26.

Harper, J. (2014). Engineers Without Borders India Water Purification and Solar Power Program. Presented at High Tech High in San Marcos, CA, USA on 2014 December 11.

Harper, J. (2014). India Potable Water Supply Program. Presented at the Engineers Without Borders-USA San Diego Professional Chapter Film Festival in San Diego, CA on 2014 October 2.

Harper, J. (2014). How do we work with local partners to ensure that the project approach is appropriate to the community? Presented at the 2014 National Conference of Engineers Without Borders USA in Reston, VA, USA on 2014 November 2.

Harper, J., & Montgomery, T. (2014). India Water Purification and Solar Power Program. Presented at the 2014 National Conference of Engineers Without Borders USA in Reston, VA, USA on 2014 November 1.

Kumar, A., **Harper, J.**, Hyman, E., & Montgomery, T. (2014). India Water Purification and Solar Power Program. Presented at the 2014 Conference of the American Society of Engineers of Indian Origin (ASEI) at the University of California, Irvine, CA, USA on 2014 September 27.

Harper, J., Hyman, E. & Montgomery, T. (2014). Solving Water and Energy Problems in Remote Locations. Presented at a Life Members' meeting of the Institute of Electrical and Electronics Engineers (IEEE) in San Diego, CA USA on 2014 September 22.

Richardson, P., Montgomery, T., Hyman, E., Kumar, A. & **Harper, J.** (2014). Solving Water and Energy Problems in Remote Locations. Presented at a section meeting of the Institute of Electrical and Electronics Engineers (IEEE), San Diego, CA USA on 2014 July 17.

Grants Funded

Graduate Assistance in Areas of National Need (GAANN) Fellowship. United States Department of Education. \$250,000. Apr 2016. Funded my PhD research.

HDR Foundation. \$60,670. Nov 2015. Funding three Engineers Without Borders projects in Andhra Pradesh, India: two community-based water purification systems (one each for the communities of Narasapuram and Chakicherla Pedda Patapu Palem); and 32 houses with rainwater catchment systems and latrines for the community of Chakicherla Pedda Patapu Palem.

Caterpillar Foundation. \$13,000. Nov 2012. Funded one Engineers Without Borders project in Andhra Pradesh, India: one solar power system with battery backup to power a reverse-osmosis water purification facility in the community of Chakicherla Pedda Patapu Palem.

Research in Progress

Santos, M., **Harper, J.**, & Da Jose, T. Sanitation markets in island nations. Data being collected.

Harper, J., Cruz, E., & Nicoletti, C. Assessing the impact of a social ecosystem approach to addressing menstrual health for school girls in Addis Ababa, Ethiopia. Data being collected.

Harper, J., Bielefeldt, A., Javernick-Will, Asaduzzaman, M., & Karki, S. Household Decision-making When Latrine Pits Fill in Rural Bangladesh. BMC Public Health. Analysis in progress.

Harper, J., Bielefeldt, A., Javernick-Will, Asaduzzaman, M., & Karki, S. Decision-making of Latrine Pit Emptiers in Rural Bangladesh. BMC Public Health. Analysis in progress.

Flood modeling of Cambodia's rivers

Groundwater depth mapping in Cambodia

autoedit: An automated editing script for Microsoft Word that works with Track Changes. Current progress is available online at <https://github.com/jamespharper/autoedit>.

Common writing errors of non-native English speakers from Asia in scientific writing: a statistical survey.

Adequate housing and its effects on a community of Scheduled Tribes people in western coastal India.

Economic sustainability in engineering development: A case study of a reverse-osmosis water treatment plant with solar power backup in a remote coastal village in India. Abstract available online at <https://goo.gl/N92K40>.

Professional Certifications and Affiliations

| | |
|--|----------------|
| Professional Engineer licensed in California | 2014 - Present |
| Member, American Society of Mechanical Engineers | 2003 - 2020 |
| Member, Engineers Without Borders-USA | 2013 - 2022 |

Skills

Expert in project conceptualization, design, analysis, construction, testing, monitoring, and evaluation

Expert in all stages of research, including study design; sampling frame calculations and randomized sampling, including clustering and blocked fractional factorial designs; survey development and administration; qualitative and quantitative data analysis; report writing and website creation; and science communication and outreach

Expert in R, Python, MS Excel, SolidWorks, and MATLAB

Experienced in Pro/ENGINEER, Visual Basic, C++, Simulink, EnergyPlus

Engineering team management, technical documentation, safety analyses, schematics, GDNT

Sanitation and water treatment systems: context-specific design, cost analysis, and maintenance

Machine shop tool operation (manual and CNC mill, lathe) and safety

Solar power systems analysis and building energy use simulation programming

MS Office and all Windows, MAC, DOS and Linux operating systems

Languages

English (fluent), Spanish (conversational), American Sign Language (basic), French (basic)

Honors

International Conference Travel Scholarship (\$2000), **Rotary International** 2019, 2020

First Place Poster Presentation (\$250), **CU Boulder Research and Innovation Week** 2019

Third Place Poster Presentation (\$100), **Symposium for Sustainable Infrastructure 2** 2017

Honorable Mention, **NSF Graduate Research Fellowship Program** 2017

First Place for [Biosand Filter](#), Instructables' [Apocalypse Preparedness Context](#) 2015

Highest Academic Achievement Award, **UC San Diego MAE Department** 2008

Best Senior Design Award, **UC San Diego MAE Department** 2008

Membership, **Tau Beta Pi Engineering Honors Society** 2003 - 2010

Membership, **Phi Beta Kappa Honors Society** 2003 - 2010

Volunteer Service

Firefighter EMT, **Timberline Fire Protection District** 2022 - Present

Adviser, [NIVAS](#) 2019 - Present

- ❖ Advise non-profit organization about earthquake-resistant housing construction program in rural Nepal

Reviewer, **Multiple journals** 2018 - Present

- ❖ Review academic articles about water and sanitation research in low-resource contexts for publication
- ❖ Journals include PLOS ONE; the Journal of Water, Sanitation and Hygiene for Development; the Integrated Journal of Social Sciences; and H2Open

Lead Engineer, **Noble Pursuits, LLC and Engineers Without Borders USA** 2012 - Present

- ❖ Managed, designed, constructing, and providing maintenance support for two community-scale RO water treatment systems; 32 earthquake-resistant houses with rainwater catchment and latrines; and a 5.4-kW solar photovoltaic system with 2 days of battery backup in rural Andhra Pradesh, India as part of a multinational engineering team
- ❖ Replaced projects' Lead Engineer on short notice and saved \$20,000 of grant funding from being lost, increasing clean-water production capacity by 300%

Adviser to Innovation Lab Steering Committee, [Engineering for Change](#) 2020 - 2021

- ❖ Advise engineering fellows in sanitation development projects and the expansion and improvement of a novel online knowledge database that describes sanitation technologies and related topics

Operation Leader & Instructor, **San Diego Mountain Rescue Team** 2010 - 2016

- ❖ Taught and practiced search and rescue techniques in all environments 24/7
- ❖ Specialty in high- and low-angle rope rescue and search management
- ❖ Served as Vice President Nov 2013 – Nov 2015

Ski Patroller, **Bear Mountain Ski Patrol** 2010 - 2013

Backpacking Trip Leader, **Sierra Club** 2010 - 2013

Scientific Editor and Reviewer, **University of California, San Diego** 2008 - 2010

Hobbies

Backpacking, rock climbing, canoeing, skiing, cooking, traveling internationally, photography

References and additional information available upon request.

Icons were created by Gregor Cresnar and Pixel Perfect, and were downloaded from [FlatIcon.com](#).