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RESEARCH PROFILE

- Digital-twin and AI/ML methods for safer, more efficient urban mobility (intersections, traffic assignment, and pedestrian safety); emphasis on rigorous simulation, causal insight, and reproducibility.
- Record of peer-reviewed publications spanning *EPJ Data Science* (2025), *Data Science for Transportation* (2024), and *ACM Transactions on Cyber-Physical Systems* (2022), with open-source artifacts when applicable.
- Demonstrated instructional excellence (UC Berkeley Outstanding GSI Award), mentoring across EECS/CEE, and cross-institution collaborations (Princeton, Rutgers, UC Berkeley).

RESEARCH INTERESTS

- Intelligent Transportation Systems
- Digital Twin Modeling
- Network Science
- Data Science
- Human-Centered Mobility

EDUCATION

- Ph.D. Civil and Environmental Engineering, August 2024
University of California, Berkeley
Labs: Mobile Sensing Lab/Berkeley AI Research (BAIR) Lab & HumNet Lab
Dissertation: Navigating Urban Traffic: From Data to Simulations to Real-World Impacts
Adviser: Prof. Alexandre M. Bayen Committee: Prof. Marta C. Gonzalez, Prof. Joan Walker
- M.S. Civil Engineering (Transportation Engineering), August 2016
Mapúa University
Thesis: Determination of Barriers towards Addressing Mobility and Accessibility through Traffic Simulation: Case of Intramuros, Manila (Adviser: Dr. Francis Aldrine Uy)
- B.S. Civil Engineering (cum laude), March 2012
Southern Luzon State University

PUBLICATIONS

Peer-Reviewed Journal Articles

4. Tang, Y., Alhadlaq, A., **Bagabaldo, A. R.**, & Gonzalez, M. C. (2025). Designing transit routes based on vehicle routing behavior determined through location-based services data. *EPJ Data Science*, 14, Article 45. <https://doi.org/10.1140/epjds/s13688-025-00559-5>
3. **Bagabaldo, A. R.**, Gan, Q., Bayen, A. M., & Gonzalez, M. C. (2024). Impact of navigation apps on congestion and spread dynamics on a transportation network. *Data Science for Transportation*, 6, Article 12. <https://doi.org/10.1007/s42421-024-00099-w>
2. Chou, F.-C., **Bagabaldo, A. R.**, & Bayen, A. M. (2022). The lord of the ring road: A review and evaluation of autonomous control policies for traffic in a ring road. *ACM Transactions on Cyber-Physical Systems*, 6(1), 1–25. <https://doi.org/10.1145/3494577>
1. **Bagabaldo, A. R.**, Añosa, J., Gapusan, J., Soriano, K., Uy, F., & Bacero, R. (2017). Determining the potential effects of the proposed removal of south provincial buses along EDSA using commuters' perception. *Journal of the Eastern Asia Society for Transportation Studies*, 12, 489–504. <https://doi.org/10.11175/easts.12.489>

Refereed Conference Proceedings

2. **Bagabaldo, A. R.**, & Hackl, J. (2025). Improving pedestrian safety at intersections using probabilistic models and Monte Carlo simulations. In *Proceedings of the International Conference on Transportation and Development (ICTD 2025)*. (Oral; accepted). Preprint: arXiv:2503.07805
1. **Bagabaldo, A. R.**, & Gonzalez, M. C. (2022). Predicting traffic flow on faulty traffic detectors using machine learning techniques. In *Proceedings of the International Conference on Transportation and Development 2022*. <https://doi.org/10.1061/9780784484319.019>

Preprints & Working Papers

1. **Bagabaldo, A. R.**, & Hackl, J. (2025). Digital twins for intelligent intersections: A literature review. *arXiv preprint arXiv:2510.05374*. <https://arxiv.org/abs/2510.05374>

CONFERENCE PRESENTATIONS / INVITED TALKS

Conference Presentations

1. **Bagabaldo, A. R.**, Gan, Q., Bayen, A. M., & Gonzalez, M. C. (2023, June). Price of information and the spread of congestion. Oral presentation at the ASCE International Conference on Transportation and Development.
2. **Bagabaldo, A. R.**, Gan, Q., Lee, J., Bayen, A. M., & Gonzalez, M. C. (2023, June). Large-scale simulation-based understanding of selfishness in routing. Poster presented at the ASCE International Conference on Transportation and Development.
3. **Bagabaldo, A. R.** (2023, June). Research highlights for PhD students. Panel speaker at the ASCE International Conference on Transportation and Development.
4. Cabannes, T., **Bagabaldo, A. R.**, Lee, J., Gan, Q., Jain, A., Blondel, A., & Bayen, A. M. (2023, January). Creating, calibrating, and validating large-scale microscopic traffic simulation. *Transportation Research Board 102nd Annual Meeting*. TRID: 2087449

Invited Talks / Guest Lectures

1. **Bagabaldo, A. R.** (2024, April 17). Guest lecture in CE 295 – Data Science for Energy: A review and evaluation of autonomous control strategies for traffic in a ring road. University of California, Berkeley.
2. **Bagabaldo, A. R.** (2017, May 31). Media interview – *The Service Road by James Deakin*. CNN Philippines (aired).
3. **Bagabaldo, A. R.** (2017, March 16). Mapúa Phil-LiDAR 1 Maps Turnover Ceremony: Big Data. Mapúa University.
4. **Bagabaldo, A. R.** (2017, March 2). Geospatial information and civil systems for a sustainable and inclusive transportation. Mapúa University.
5. **Bagabaldo, A. R.** (2017, February 17). Presenter, Intelligent Transportation Systems (ITS) Forum. De La Salle University–Manila.

ACADEMIC APPOINTMENTS

- 2025– **Rutgers University** (Piscataway, NJ)
Postdoctoral Associate, Center for Advanced Infrastructure and Transportation
- 2024–25 **Princeton University** (Princeton, NJ)
Postdoctoral Research Associate, Complex Infrastructure Systems Group (with Prof. Jürgen Hackl)
Lead research on digital twins for intelligent intersections, with emphasis on urban mobility, safety, and infrastructure resilience; cross-institution collaboration with Rutgers and the Municipality of Princeton; co-develop competitive proposals.
Professional development: GradFutures Sustainability Learning Cohort (Spring 2025)
- 2019–24 **University of California, Berkeley** (Berkeley, CA)
Graduate Student Instructor (multiple courses; see *Courses Taught*); Reader/Grader for IE 242 – Applications in Data Analysis (Fall 2019–Fall 2021)
- 2014–19 **Mapúa University** (Manila, Philippines)
Instructor/Lecturer (see *Courses Taught*)
Program Chair (Aug 2018–Jan 2019): Led curriculum review; faculty hiring/teaching assignments; industry and accreditation liaison; data-informed assessment.
Senior Science Research Specialist (Sep 2016–May 2017): DOST-funded Mapúa Phil-LiDAR 1 – Flood Hazards Modeling for Cavite, Batangas, Rizal, and Quezon; mentored LGUs and coordinated official turnover of hazard maps.
Research Associate (Jun 2013–Aug 2016): Full-time GIS specialist producing terrain models from LiDAR for national flood-hazard mapping.
- 2013–14 **Southern Luzon State University** (Quezon, Philippines)
Contract of Service Instructor, College of Engineering

AWARDS & FELLOWSHIPS

- 2024 Outstanding Graduate Student Instructor (GSI) Award, UC Berkeley – campus-wide recognition (10% of GSIs)
- 2019–23 Ph.D. Overseas Scholarship, Commission on Higher Education – Philippine California Advanced Research Institutes (CHED–PCARI)
- 2016 Dean’s Council Scholarship, Mapúa University
- 2016 JSCE Study Tour Grant, Japan Society of Civil Engineers
- 2016 Young Future Energy Leaders, Masdar Institute of Science and Technology (Abu Dhabi, UAE)

TEACHING INTERESTS & COURSES TAUGHT

Teaching Interests (courses prepared to teach)

- Intelligent Transportation Systems; Traffic Flow Theory; Transportation Data Science; Public Transportation; Network Science for Mobility; Optimization and Simulation for Infrastructure Systems; GIS for Transportation; Urban Analytics; Intro to Programming for Civil Engineers (Python).

University of California, Berkeley (Graduate Student Instructor)

As a GSI at Berkeley, I led sections, supported curriculum delivery, graded assignments/exams, and mentored students while completing formal pedagogy training.

Graduate-level

- CE C263H/CP C257H – **Human Mobility and Network Science** (Fall 2023): Techniques for analyzing daily activities/travel at urban and global scales; interactions with built and natural environments.
- CE 295 – **Data Science for Energy** (Spring 2023, Fall 2021): Energy system management and control tools; batteries, EVs, renewables, power systems, and smart buildings/homes; modeling, state-space, observers, feedback control, and optimization.
- CE 263N/CP 257 – **Scalable Spatial Analytics / Data Science for Human Mobility and Socio-technical Systems** (Fall 2022): Spatial statistics, EDA, spatial data mining, ML (discriminative/generative), and visualization.
- CE 259 – **Public Transportation Systems** (Spring 2022): Technology, operations/management, policy, and financing of transit systems.

Undergraduate

- PHYSICS 8A – **Introductory Physics** (Spring 2024, Summer 2023): Forces, kinetics, equilibria, fluids, waves, and heat; foundations for upper-division study.
- CE C88/CP C88 – **Data Science for Smart Cities** (Spring 2021): Working with data from transportation, power grids, communications, crowd- and remote-sensing; demand/supply-side urban services via analytics.

Mapúa University (Instructor of Record)

- Undergraduate courses in Methods of Research, Transportation Engineering, and Engineering Economy; supervised undergraduate theses.

Southern Luzon State University (Instructor of Record)

- Undergraduate courses in Traffic Engineering, Soil Mechanics, and Fluid Mechanics.

MENTORSHIP & SERVICE

Research Mentorship (UC Berkeley)

- *Undergraduate:* Arya Bakhtiar (EECS, 2023–2024; now MS student, Stanford), Preston Fu (EECS, 2022–2023), Qianxin Gan (EECS, 2022–2023; now Software Engineer, Google), John Lee (EECS, 2021–2022; now Software Engineer, Wing)
- *Graduate:* Yuhan Tang (CEE Systems, 2023–2024; now graduate student at MIT)

Leadership

2023–24 Vice President & Founding Member, Representation of Asian and Pacific Islanders in CEE (RAPID-CEE), UC Berkeley

2016–18 Faculty Adviser, Transportation Science Society of the Philippines – Mapúa Student Chapter

2010–11 Vice President, College of Engineering Student Council, Southern Luzon State University

Referee Service

- *Transportation Research Board (TRB) Annual Meeting; IEEE Intelligent Transportation Systems Conference (ITSC)*

PROFESSIONAL MEMBERSHIPS

- Eastern Asia Society for Transportation Studies – Transportation Science Society of the Philippines (Regular Member, 2017–present; Associate, 2016–2017)
- Japan Society of Civil Engineers (Associate Member, 2016–present)
- American Society of Civil Engineers (Affiliate Member, 2024–present; Student Member, 2022–2024)

Updated October 2025