

TRANSPORTATION CONCENTRATION

Planning, design and management of multimodal transportation systems is an area in which engineers can contribute to addressing a wide variety of challenges. These range from congestion, to security, to environmental impact. A typical transportation system includes **vehicles, network infrastructure and information technology**, used both for monitoring and control and to provide information to users of the system. The interactions of people with the system are especially complex and important.

Faculty are currently pursuing research in automated traveler-information systems, freight transportation and security, consumer adoption of low-emission and alternative fuel vehicles, and air quality issues in urban transportation. Study in transportation systems engineering often includes work in related areas, such as economics, operations research, systems engineering, city and regional planning, and management.



Cornell is the home base for CTECH, the Center for Transportation, Environment, and Community Health, a Cornell-led consortium of universities researching and developing new transportation innovations to limit adverse impacts on public health and the environment. The center's research addresses critical issues falling under the FAST Act's priority area of *Preserving the Environment*: greenhouse gas reduction, use of alternative fuels and energy technologies, environmentally responsible planning, and impacts of freight movement.

For more information, please visit
<http://ctech.cee.cornell.edu>

WHERE TO APPLY:

www.gradschool.cornell.edu/admissions/applying/apply-now

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Civil and Environmental Engineering



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**TRANSPORTATION
SYSTEMS
ENGINEERING**

Master of Science/
Doctor of Philosophy

FACULTY RESEARCH

Graduate students collaborate with Transportation Systems faculty on research that pushes the boundaries of our knowledge. Our faculty has always represented the best the field has to offer—engineers and scholars of the highest caliber, internationally recognized for their research and the quality of instruction they offer.

RICARDO A. DAZIANO



Research Interests: Daziano’s research concerns the theoretical and applied econometrics of consumer behavior and, in particular, discrete choice models applied to technological innovation and transportation. Examples of this research include the analysis of pro-environmental preferences towards low-emission vehicles, modeling the adoption of sustainable travel behavior, and forecasting consumers’ response to environmentally-friendly energy sources.

OLIVER H. GAO



Research Interests: Gao’s interests include transportation, environmental, and energy systems. Examples are mobile emissions inventory and air quality modeling; environmental and energy impacts of alternative fuel, engine, and infrastructure transportation technologies; environmental economics; and complex networks of renewable energy supply chains. His methodologies involve statistics, econometrics, mathematical modeling, operations research, and experiments.

LINDA K. NOZICK



Research Interests: Nozick’s activities focus on the development of mathematical models for use in the management of complex systems. She has a particular interest in systems that can be represented mathematically as networks, including transportation and logistics systems, civil infrastructure networks and project networks.

SAMITHA SAMARANAYAKE



Research Interests: Samaranayake’s research interests are in the modeling, analysis and control of networked infrastructure systems with a focus on transportation networks. He works primarily on problems related to vehicle routing with applications in route planning with reliability guarantees, dynamic traffic assignment and control, and ride-sharing systems. He

is particularly interested in developing computationally efficient solution techniques and algorithms that enable practical applications.

FACULTY PROJECT



@ CORNELL

Professor Samaranayake’s research group focuses on designing cutting edge transportation systems that are being driven by the ongoing technological revolution in communications and information technology. For example, students are designing a prototype multi-modal on-demand transit system for urban areas that combines services like bikesharing and ridesharing with mass transit solutions to showcase how such a system can improve urban mobility and reduce negative externalities such as vehicular emissions. The project incorporates ideas from demand and network modeling, algorithms, simulation and environmental impact assessment to provide a broad overview of the tools required to solve urban transportation problems in this age. This is an interdisciplinary effort that requires collaborations with faculty members from multiple departments at Cornell. It also involves collaborations with multiple private and public sector partners, who can provide access to real-world data and practical considerations seen by those regulating and operating transportation systems.

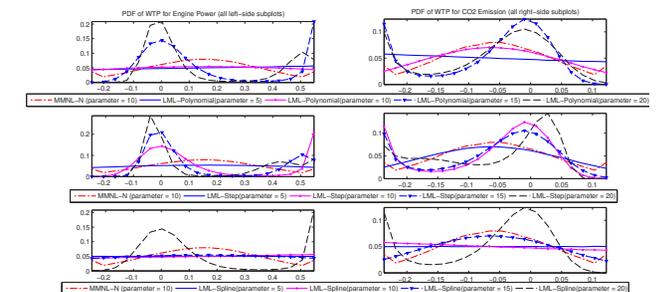
STUDENT RESEARCH

Graduate Students in the M.S. and Ph.D. programs are expected to demonstrate mastery of knowledge in a specific subject area in Civil and Environmental Engineering and to synthesize and create new knowledge, making original and substantial contributions to their discipline.

PRATEEK BANSAL



Prateek Bansal is interested in the estimation of advanced discrete choice models and their application in transportation planning and management. He is currently working on improving the estimation of semiparametric discrete choice models by developing and implementing Expectation-Maximization (EM) and Minorization-Maximization (MM) algorithms. He plans to use these models to estimate the sensitivity of the demand for ride-sharing services (e.g. Uber and Lyft) in New York City with respect to waiting time and trip cost of these services.



Above: Probability Density Function of the Willingness to Pay of German Vehicle Buyers for Engine power and saving CO2 emissions.