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Karen Noiva

EDUCATION

MIT | Cambridge, MA

Ph.D. in Architecture: Building Technology
2018 | GPA: 4.9/5.0
Thesis: International Comparative Analysis of Urban Water Systems

M.S. in Architecture: Building Technology
2011 | GPA: 4.8/5.0
Thesis: Modeling the Water Consumption of Singapore Using System Dynamics

B.S. in Mechanical Engineering
2008 | GPA: 4.8/5.0
Concentration in Sustainability Science

COURSEWORK

GRADUATE

System Dynamics
Statistical Learning and Data Mining
Computational Science and Engineering
Time Series Analysis
Socioeconomic Impact Analysis
Infrastructure Economics
Finance
Risk and Decision Analysis
Engineering Systems Analysis
Spatial Analysis
Geographic Information Systems
Surface Hydrology
Water Resources Management

UNDERGRADUATE

Solid State Chemistry
Design and Manufacturing
Dynamics and Control
Measurement and Instrumentation
Mechanics of Materials
Product Engineering
Thermal Fluids Engineering
Desalination
Design for Development
Sustainability Science

LANGUAGES

English (native) • French • Chinese (Mandarin) • Portuguese • Spanish

SUMMARY

Ph.D. with 8+ years of interdisciplinary research. Expertise in applied methods for policy analysis, urban water infrastructure, and sustainability. Strong analytical, technical, and communication skills. Leadership experience in academia and industry. Team player who loves to bring people together to collaborate on new projects.

EXPERIENCE

UNIVERSITY OF ARIZONA | Research Scientist
2018 – Present | Cambridge, MA

- Creating system to process, clean, and analyze user data from 100+ sessions from video game for mining emergency response training.
- Performing exploratory analysis with clustering and other model-based methods.
- Identifying key indicators and patterns using statistical methods.
- Developing visualizations to help practitioners interpret data and trends.
- Applying machine learning to create predictive models of performance.
- Disseminating findings through reports and industry presentations.

HARVARD UNIVERSITY | Teaching Fellow
2018 | Cambridge, MA

- Developed and presented 10 lectures and tutorials teaching business analytics and R to graduate and undergraduate students in intensive 3-week summer course.
- Worked individually with students to support learning goals.

MIT | Ph.D. Candidate & Research Assistant
2011 – 2018 | Cambridge, MA

- Developed a new algorithmic approach and open-source tools (in R and Python) for quantitative comparison of sustainability of urban water systems.
- Identified six types of cities from 142 international cases with statistical clustering.
- Used typology to guide selection of "similar but different" cases, Singapore and Los Angeles, for comparison with ANOVA, time-series, and spatial analysis.
- Identified similar policy resistance to conservation efforts, highlighting an unexpected opportunity for policy exchange.
- Developed a new integrated urban water resources model using Vensim/Excel.
- Calibrated feedback model with 60 years of historical data from Singapore.
- Forecasted demand, supply, and infrastructure finance given changing population growth, economic growth, affluence, and alternative water sources.

IBM | Graduate Research Intern
2013 | Nairobi, Kenya

Led team of 4 interns in completion of 3 projects at the Nairobi Research Lab:

- Created a Monte Carlo model of water demand and simulated future water stress in Nairobi under uncertain precipitation and population growth.
- System architecture design of a mobile app for a mobile advertising business.
- Design and implementation of a $150 prototype weather station (1/10 the cost of commercial products) and a week-long STEM workshop for high-school students.

PROGRAMMING/SOFTWARE SKILLS

R • Python • LaTeX • ArcGIS/GRASS GIS • HTML/CSS/Markdown • SQL • Vensim • Matlab • GAMS • Microsoft Office • Adobe Creative Cloud

SELECTED LEADERSHIP

NSF | RCN Sustainable Cities | Student Workshop Organizer
Spring 2014 | Phoenix, AZ
- Initiated and co-organized an interdisciplinary workshop for 9 graduate students from 7 institutions.

MIT | Sustainability Summit | Panel Organizer
2014 | Cambridge, MA
- Organized panel on infrastructure financing and urban resilience for hundreds of researchers and practitioners.

MIT | Urban Recycling Club, Bexley Hall | Co-Organizer and Participant
2006 – 2008 | Cambridge, MA
- Co-organizer of an informal MIT club for those interested in exploring urban waste streams.
- Collected used cooking oil from local restaurants to fuel a converted biodiesel truck.
- Harvested edible food from dumpsters at various supermarkets in Middlesex County.

MIT | 2.009: The Product Engineering Process | Team Integrator
Fall 2007 | Cambridge, MA
- Led a team of 16 mechanical engineering students in the senior capstone project.
- Developed a bicycle-powered nut grinder for small-business owners in Ghana.
- Defined project goals, coordinated tasks and deadlines, managed communication, and represented team to stakeholders.

MIT | Women's Independent Living Group | Various Positions
2004 – 2007 | Cambridge, MA
- Elected to house manager, membership coordinator, food steward, and computer chair during non-overlapping semesters.
- Various responsibilities overseeing the running and budgets of a 40-member cooperative living group.

BICYCLE TOURS

Co-Organizer and Cyclist

Spring 2009 | Sub-Saharan Africa
- Cycled 3,600 miles from Cape Town, South Africa to Dar es Salaam, Tanzania, through Botswana, Zambia, Malawi.

Summer 2007 | United States
- Cycled 3,700 miles from Portland, OR to Washington, DC, through 13 states.

SELECTED PUBLICATIONS

- Karen Marie Noiva. "International Comparative Analysis of Urban Water Systems". Ph.D. thesis. MIT, 2017.
- Karen Noiva, John E. Fernández, and James L. Wescoat. "Cluster Analysis of Urban Water Supply and Demand: Toward Large-Scale Comparative Sustainability Planning". In: *Sustainable Cities and Society* 27 (2016), pp. 484–496.
- Matthias Wörlen, Bettina Wanschura, Herbert Dreiseitl, Manfred Moldaschi, James L. Wescoat, Jr., and Karen Noiva. *Strengthening Blue-Green in Our Cities: Enhancing Blue-Green and Social Performance in High Density Urban Environments: Final Report*. Rambøll Foundation, 2016.
- Karen Noiva Welling. "Modeling the Water Consumption of Singapore Using System Dynamics". S.M. thesis. MIT, 2011.

SELECTED PRESENTATIONS

- Karen Noiva, Leonard D. Brown, and Mary Poulton. *Guidelines for Developing an Effective Safety Toolbox*. Presented at the 12th Annual New Mexico Mine Health & Safety Conference, Albuquerque, NM. June 2019.
- Karen Noiva. *Energy in the Built Environment: Sustainability 101*. Invited lecturer at the MIT Energy Initiative Lecture Series, Cambridge, MA. Nov. 2013.

SELECTED COMMUNITY SERVICE

2012 – 2014	MIT	Graduate Women's Group	Mentored undergraduate and graduate women
2011 – 2013	MIT	IDEAS Global Challenge	Mentored teams on innovation for rapidly developing markets
Spring 2008	MIT	2.007	Mentored undergraduates on engineering design for robot competition
2004 – 2007	MIT	Medlinks	First-responder and student health liaison