

Brian Coffey

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DEGREE EDUCATION

<i>University of California Berkeley</i>	Ph.D. , Architecture	2011
Major: Building Science, Minors: Control Theory, Operations Research, Second Language: French Dissertation: 'Using Building Simulation and Optimization to Calculate Lookup Tables for Control'		
<i>Concordia University (Montreal)</i>	M.A.Sc. , Building Engineering	2008
Thesis: 'A Development and Testing Framework for Simulation-Based Supervisory Control With Application to Optimal Zone Temperature Ramping Demand Response Using a Modified Genetic Algorithm'		
<i>U. of Victoria (BC, Canada)</i>	B.Eng (incomplete), Mechanical Engineering	2002- 2005
<i>McMaster University</i>	B.A.Sc. {Hon} , Arts & Science	2003
Thesis: 'Fuel Cells in Context, 1800-1980: Towards a History of the Technology and its Shaping Influences'		

CONTINUING EDUCATION

<i>Insight Data Science</i>	Data Science Leader	2017
	Data Science Fellow	2015
<i>HBX Harvard Business School</i>	CORE: Credential of Readiness, Pass with High Honors	2016
<i>Coursera</i>	Specialization in Business Fundamentals (UPenn Wharton)	2016
	Specialization in Data Science (Johns Hopkins)	2014- 2015
	Additional courses: Machine learning, Algorithms (Stanford)	2014- 2015
<i>Oxford University Cont. Ed.</i>	Courses: Intro Microeconomics, Intro Macroecon.	2014

EMPLOYMENT

<i>Valkyrie Intelligence</i>	Principal Scientist	Remote, Nov 2017 - present
Providing data science and data visualization expertise for a startup fusing applied science and strategy consulting		
<i>Atelier Ten</i>	Research Associate	Remote, Feb 2018 - present
Developing Radiance, EnergyPlus, data and scripting tools for various projects		
<i>Freelance</i>	Consultant	Remote, various periods from May 2012 - present
Freelance software development and consulting in data science and architectural engineering. Clients have included Xerohome, National University of Ireland Galway, UCL, SuPerB, Atelier Ten, and LBNL. Founded and operated Texture Data & Design, Inc, Aug 2016 - present, to house some of this work.		
<i>Stitch Fix</i>	Data Scientist	San Francisco, CA, Aug 2015 - Oct 2017
Developed tools and performed business analysis as part of the Algorithms team. Projects included the development of a stylist management tool, conception and prototyping of an automated photo-based measurement system, a major PR scrollytelling animation, and an interactive forecasting tool for operations management.		
<i>Apidae Labs</i>	Startup Team Member	Ithaca, NY, Mar 2014 - Feb 2015
Market analysis, MVP app design, customer discovery, graphic design and product development for a cloud-based building simulation and optimization platform		

University College London Principal Research Assoc. London, UK, Mar-Sep 2014
Developed a simulation-based model of the UK non-domestic building stock, with an innovative approach wherein physics-based models are automatically generated for every building in the stock, along with statistical techniques to project changes in the stock under different regulatory and technological scenarios.

Lawrence Berkeley National Lab Principal Scientific Eng. Associate Mar 2013 - Feb 2014
Developed and tested implementable approximations to optimal control for integrated control of dynamic facades and HVAC systems

Atelier Ten Environmental Designer SF & NY, 2010 - 2012
Performed custom analysis for a wide range of architectural design projects and developed in-house analysis tools

National Research Council Visiting Scholar Ottawa, 2010
Developed a photometric model in Radiance for analysis of an innovative sunlighting system

Lawrence Berkeley National Lab Graduate Student Researcher Berkeley, 2007 - 2009
Worked with a team of experts to develop and test a Model Predictive Control implementation for the UC Merced chilled water system, performed detailed EnergyPlus studies of prototype designs, retrofits and controls for a large retail chain, and developed macro-scale models of energy consumption in the US commercial building stock

Public Works & Gov. Services Canada Research Assistant Ottawa, 2004 - 2006
Developed and analyzed control strategies for distributed heat and power generation systems

AWARDS AND FELLOWSHIPS

National Science and Engineering Research Council PGS-D Scholarship	2009 - 2011
American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) Grant-in-Aid	2009 - 2010
T.Y. Lin Prize for Architectural Engineering Research, UC Berkeley	2009
International Building Performance Simulation Association Canada Best Student Paper Award	2006
NATO Advanced Study Institute: Thermal Energy Storage for Sustainable Energy Consumption, Fellow	2005
Student of the Year Award, Nicholson Catholic College (secondary school, Belleville, Canada)	1997

PUBLICATIONS

Journal Articles

- Lee ES, Gehbauer C, Coffey B, McNeil A, Stadler M, Marnay, C. 'Integrated control of dynamic facades and distributed energy resources for energy cost minimization in commercial buildings' *Solar Energy* 122, 1384-1397, 2015.
- Coffey B. 'Approximating Model Predictive Control with Existing Building Simulation Tools and Offline Optimization' *J. of Building Performance Simulation*, 6(3), 220-235, 2013.
- Laouadi A, Coffey B. 'The Energy Performance of the Central Sunlighting System' *Journal of Building Performance Simulation*, 5(4), 234-247, 2012.
- Ma Y, Borrelli F, Hency B, Coffey B, Bengea S, Haves P. 'Model Predictive Control for the Operation of Building Cooling Systems' *IEEE Trans. on Control Systems Technology*, 20(3), 796-803, 2012.
- Coffey B, Haghghat F, Morofsky E, Kutrowski E. 'A Software Framework for Model Predictive Control with GenOpt' *Energy and Buildings*, 42(7), 1084-1092, 2010.
- Coffey B, Borgeson S, Apte J, Mathew P, Haves P, Selkowitz S. 'Towards a Very Low Energy Building Stock: Modeling the US Commercial Building Sector to Support Policy and Innovation Planning' *Building Research & Information*, 37(5), 610 - 624, 2009.
- Komiyama R, Marnay C, Stadler M, Lai J, Borgeson S, Coffey B, Azevedo IL. 'Japan's Long-term Energy Demand and Supply Scenario to 2050 - Estimation for the Potential of Massive CO₂ Mitigation' *IEEJ Journal (The Inst. of Energy Economics, Japan)* 4(2), 2009.

- Coffey B, Kutrowski E. 'Demand charge considerations in the optimization of cogeneration dispatch in a deregulated energy market' *International Journal of Energy Research*, 30(7), 535-551, 2006.

Conference Papers

- Coffey B, Stone A, Ruysevelt P, Haves P. 'An Epidemiological Approach to Simulation-Based Analysis of Large Building Stocks' *Proc. of IBPSA International*, 2015.
- Coffey B, Tuhus-Dubrow D, Munshi M. 'All the ways of meeting a target: Calculating a solution surface using GenOpt' *Proc. of SimBuild (IBPSA-USA)*, 2012.
- Munshi M, Tuhus-Dubrow D, An J, Coffey B. 'Practical Techniques for Automated Calibration of Existing Models for Use in Building Operations' *Proc. of SimBuild*, 2012.
- Nahman JE, Coffey B, Deringer J. 'Development of Open-Source Parametric EnergyPlus Models and their use for Savings Potential Analysis of Envelope Measures' *ACEEE Summer Study - Energy Efficiency in Buildings*, 2012.
- Coffey B. 'Using Building Simulation and Optimisation to Calculate Control Lookup Tables Offline' *Proc. of IBPSA International*, 2011.
- Coffey B, Haves P, Hency B, Ma Y, Borrelli F, Bengea S. 'Development and Testing of Model Predictive Control for a Campus Chilled Water Plant with Thermal Storage' *ACEEE Energy Efficiency in Buildings*, 2010.
- Ma Y, Borrelli F, Hency B, Coffey B, Bengea S, Haves P. 'Model Predictive Control for the Operation of Building Cooling Systems' *Proc. of the American Control Conference*, pp 5106-5111, 2010
- Marnay C, Borgeson S, Coffey B, Stadler M, Lai J, Komiyama R. 'A Buildings Module for the Stochastic Energy Deployment System' *ACEEE Summer Study - Energy Efficiency in Buildings*, 2008.
- Haves P, Coffey B, Williams S. 'Benchmarking and Equipment and Controls Assessment for a 'Big Box' Retail Chain' *ACEEE Summer Study - Energy Efficiency in Buildings*, 2008.
- Marnay C, Stadler M, Aki H, Coffey B, Firestone R, Lai J, Siddiqui. 'A Microgrid Selection and Operation for Commercial Buildings in California and New York States' *4th European PV-Hybrid and Mini-Grid Conference*, 2008.
- Coffey B, Kutrowski E. 'Effective Control of Combined Heating, Cooling and Power Systems in an Hourly-Price Electricity Market' *Proc. of Cold-Climate HVAC, Moscow*, 2006.
- Coffey B, Morofsky E, Haghighat F. 'Model-Based Control of Responsive Building Systems: A Summary of its Potential and Challenges' *Proc. of eSim (IBPSA-Canada)*, 2006.

Technical Reports (LBNL, US Department of Energy, California Energy Commission, etc)

- [LBNL-1004337] Lee ES, Coffey B, Fernandes LL, Hoffmann S, McNeil A, Thanachareonkit A, Ward GJ. 'High Performance Building Facade Solutions-Phase II', 2014.
- [LBNL-6023E] Lee ES, Fernandes LL, Coffey B, McNeil A, Clear R, Webster T, Bauman F, Dickerhoff D, Heinzerling D, Hoyt T. 'A post-occupancy monitored evaluation of the dimmable lighting, automated shading, and underfloor air distribution system in The New York Times Building', 2013.
- [DOE / CEC PIER Technical Report] Coffey B. 'Integrated control of operable fenestration systems and thermally massive HVAC systems: Methods and simulation studies of energy savings potential', 2012. <http://facades.lbl.gov/publications/integrated-control-operable>
- [DOE / CEC PIER Technical Report] Coffey B, Lee E. 'Model-based controls for integrated shading and UFAD control: Report on initial studies', 2011. <https://facades.lbl.gov/publications/model-based-controls-integrated>
- [LBNL-3906E] Haves P, Hency B, Borrelli F, Elliot J, Ma Y, Coffey B, Bengea S, Wetter M. 'Model Predictive Control of HVAC Systems: Implementation and Testing at the University of California, Merced', 2010.
- [LBNL-1334E] Stadler M, Marnay C, Siddiqui A, Lai J, Coffey B, Aki H. 'Effect of Heat and Electricity Storage and Reliability on Microgrid Viability: A Study of Commercial Buildings in California and New York States', 2009.
- [LBNL-3067E] Walker IS, Al-Beaini S, Borgeson S, Coffey B, Gregory D, Konis K, Scown C, Simjanovic J, Stanley J, Strogon B. 'Feasibility of Achieving Zero-Net-Energy Net-Zero-Cost Homes', 2009.
- [CBE - Executive Summary] Borgeson, S, Brager B, Coffey B, Haves P. 'Mixed Mode Simulations for Climate Feasibility', 2009. <http://escholarship.org/uc/item/0hk689fx>

OTHER

Teaching

Graduate-Level Course Designer and Co-Lecturer
UC Berkeley Arch 298: Advanced Building Energy Simulation 2011

Professional and Volunteer Activities

Organizing Committee Member *Intelligent Building Operations Workshop*, Boulder CO 2013
Workshop Organizer IBPSA Canada-USA *Model Predictive Control in Buildings* 2011
National Board Member (USA) International Building Performance Simulation Assoc. (IBPSA) 2008 - 2010
Convener, Interim Committee IBPSA-USA San Francisco Chapter 2010
Graphic Design *Intelligent Building Operations Workshop* 2013
MPC in Buildings Workshop 2011
SimBuild Conference 2008
Journal Referee *J. of Building Performance Simulation, Building Research & Information*
Conference Referee *IEEE Conf. on Decision and Control, American Control Conf., SimBuild*

Other Presentations of Note

Tutorial Session, *PyData NYC: Using D3 in Jupyter* 2015
Invited Seminar Presentation, *ASHRAE: Application of Dynamic Optimization to Smart Building Systems* 2014
Invited Presentation, 'Using Energy Simulation to Improve Building Performance: Combining BIM and Energy Monitoring', *cbxchange.org 'Benefitting from BIM' event*, London 2014
Invited Presentation, *Natural Resources Canada – Varennes, Controls Research Group*, to help develop their 3-year plan, presented a survey of the state of the art in MPC research for buildings 2011
Presentation to *IEA Working Group ECES Annex 20* (Energy Conservation through Energy Storage, Sustainable Cooling), representing *Public Works & Government Services Canada*, Japan 2005

INTERESTS

Music

Juilliard Evening Division (New York), Advanced Forum / Chopin Etudes classes 2012
San Francisco Conservatory, Adult Extension, lessons and performances 2010 - 2011
Royal Conservatory of Music, Toronto: Grade 9 Piano with Honours,
Grade 3 History with Honours, Grade 3 Harmony with First Class Honours 1997

Visual Arts

The Art Students League of New York, Figure Drawing 2012
Building Local design-build workshop, Barichara, Columbia 2012
UC Berkeley Arch 200A: Graduate architecture studio course, part of PhD 2007
Emily Carr Institute of Art and Design, Continuing Studies:
Basics of Architectural Design, Drawing for Architecture 2003, 2005
Ottawa School of Art: Perspective Drawing, Figure Drawing, Sculpture Casting, Intro to Painting 2003 - 2004

Sport, Travel and Outdoor Adventure

Five marathons (PB: 3:02), one triathlon, mountaineering and glacier travel, treks in the Himalaya 1998 - 2012
Solo bicycle voyage across Canada 2000
Canada World Youth's development program in Tunisia and Quebec 1999
High school varsity athlete: basketball, volleyball, track and field, badminton, golf 1997