

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>Stitch Fix</i>	Data Scientist	San Francisco, CA, Aug 2015 - Aug 2016 Remote (part-time contractor), Sep 2016 - Oct 2017 SF, May 2018 - present
Developing tools and performing business analysis as part of the Algorithms team, first in the Data Labs group, then with Data Platform Frontend, and now with Styling & CX Operations. Projects have 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>Atelier Ten</i>	Environmental Designer Research Associate	SF & NY, 2010-2012, 2015 Remote (part-time), Feb-Apr 2018
Performed custom analysis for a wide range of architectural design projects, developed in-house analysis tools and provided in-house training in building simulation and Python.		
<i>Freelance</i>	Consultant	Remote, various periods, 2012 - 2018
Freelance software development and consulting in data science and architectural engineering. Clients have included Kinestral, Xerohome (Vistar Energy), National University of Ireland Galway, UCL, SuPerB and LBNL. Founded and operated Texture Data & Design, Inc (2016-2018) to house some of this work.		
<i>Apidae Labs</i>	Startup Team Member	Ithaca, NY, 2014 - 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, 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. Assoc. Berkeley, CA, 2013 - 2014
Graduate Student Researcher 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. Developed and tested implementable approximations to optimal control for integrated control of dynamic facades and HVAC systems.

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

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

ADVISORY ROLES

Valkyrie Intelligence Scientific Advisor Nov 2017 - present
Providing architecture-industry and data vis expertise for a startup fusing applied science and strategy consulting

Atelier Ten Research Associate May 2018 - present
Providing training and project expertise related to cloud computing, scripted and interactive architectural analysis

Xerohome (Vistar Energy) Advisor Aug 2018 - present
Providing technical and business strategy advice for a startup that uses data analytics and building simulation to help homeowners get to net-zero energy and to help utilities target incentive programs. As a freelance consultant, I developed the front-end and designed and developed the engine for the MVP and initial client work. The project has now secured DOE-SBIR funding and more client work; I am advising them as they iterate and scale.

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, Bengae 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

- Saxena M, Coffey B, May-Ostendorp P, Rasin J, Wilson E, Horowitz S. 'Simplifying Energy Efficiency for Homeowners - Results from a California Utility's Pilot Study of a Scalable Solution to Assess Retrofit and Solar Opportunities' *ACEEE Summer Study*, 2018
- Coffey B, Stone A, Ruyssevelt 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, Bengae 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, Bengae 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, Haghghat 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, Benga 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*

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