Gabriel Tomas Fierro

Email : gtfierro@mines.edu

https://home.gtf.fyi

Academic Appointments

Colorado School of Mines — Golden, CO
Assistant Professor, Computer Science — *August 2021 - present*

National Renewable Energy Laboratory — Golden, CO
Joint Appointment — *July 2021 - present*

Research Interests

Data/metadata management, systems, Internet of Things, ontology design, database implementation, smart buildings/cities/grids

Education

Ph.D. in Computer Science — August 2015 - May 2021
University of California, Berkeley — *Berkeley, CA*

- **PhD Thesis**: Self-Adapting Software for Cyberphysical Systems
- **Advisor**: David E. Culler

M.S. in Computer Science — December 2018
University of California, Berkeley — *Berkeley, CA*

- **Masters Thesis**: Design of an Effective Ontology and Query Processor Enabling Portable Building Applications
- **Advisor**: David E. Culler

B.S. in Electrical Engineering and Computer Sciences — August 2009 - May 2013
University of California, Berkeley — *Berkeley, CA*

Awards

Google-CMD-IT Dissertation Fellowship Award — Fall 2020
One of 11 recipients of $25,000 for "positively influencing the direction and perspective of technology", in alignment with the FLIP Alliance mission.

Georgia Tech Focus Fellow — Fall 2020
One of two students from UC Berkeley chosen to attend the Georgia Tech Focus Fellows program

David Wessel Best Demo Award — Fall 2019
Demonstrated a VR-based network debugging platform at the CONIX Research Center Annual Review (https://conix.io/)

Outstanding Graduate Student Instructor — Fall 2018
For service for the CS168 course: Introduction to the Internet: Architecture and Protocols

Best Paper Presentation Award — BuildSys 2018
For presentation of the conference paper *Mortar: An Open Testbed for Portable Building Analytics*

EECS Chair's Special Award — Fall 2016
For service to the department as member of the Computer Science Graduate Student Association and in helping to organize PhD Visit Day

Audience Choice Award (Best Paper Finalist) — BuildSys 2016
For the conference paper *Brick: Towards a Unified Metadata Schema for Buildings*

Best Demo Award — BuildSys 2016
For the demo *Portable Queries Using the Brick Schema for Building Applications*

Best Paper Award — BuildSys 2012
For the workshop paper *Building Application Stack (BAS)*

Service

DATA 2020 Workshop Co-Chair — Fall 2020
Organized and managed the Data Acquisition To Analysis Workshop, co-located with SenSys/BuildSys: https://workshopdata.github.io/DATA2020/

BuildSys 2020 Web Co-Chair Fall 2020
http://buildsys.acm.org/2020/

Annex 81 Participant Fall 2020 - present
Invited as an expert to join an International Energy Agency-sponsored investigation into Data-Driven Smart Buildings: https://annex81.iea-ebc.org/

ASHRAE Semantic Interoperability Working Group Fall 2018 - present
Active participant in the development of proposed ASHRAE Standard 223P, a Semantic Data Model for Analytics and Automation Applications in Buildings: http://www.bacnet.org/WG/SI/index.html

Computer Science Graduate Association Fall 2016 - present
Helped to organize and run PhD Visit Day for admitted students. As **President** of the organization for 2.5 years, I organized department town halls, department-wide student surveys, helped rebuild student involvement in the faculty hiring process, and advised the department on graduate student perpsective on policy changes

Bias Busters Fall 2018 - present
Bias Busters is an organization run by graduate students, faculty, and staff to address implicit bias issues in the EECS department at UC Berkeley. I helped to organize speaker series and run trainings and workshops on implicit bias. https://biasbusters.berkeley.edu/

Grants and Projects

Skewering The Silos *DE-EE0008681*
*(Authored)*Developing the Brick metadata ontology to enable portable analytics, modeling, controls in buildings

ENERGISE *DE-EE0008008*
Enabling Extreme Real-time Grid Integration of Solar Energy

XBOS-DR *EPC-15-057*
Customer-controlled, price mediated, automated demand response for commercial buildings

XBOS-V *EPC-15-013*
Plug-in electric vehicle smart charging in California

Hamilton *DE-EE0007685*
Flexible, Open Source $10 Wireless Sensor System for Energy Efficient Building Operation

Software Defined Buildings *CPS-1239552*
Information substrate for efficient, agile, model-driven, human-centered building systems

Conference Publications

- **Gabe Fierro**, Prakash, A. K., Mosiman, C., Pritoni, M., Raftery, P., Wetter, M., and Culler, D. E. (2020d). Shepherding Metadata Through the Building Lifecycle. In *Proceedings of the 7th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, BuildSys '20, Virtual Event, Japan

  Acceptance Rate: 38 / 139 (27%)

- **Gabe Fierro**, Koh, J., Agarwal, Y., Gupta, R. K., and Culler, D. E. (2019b). Beyond a House of Sticks: Formalizing Metadata Tags with Brick. In *Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, BuildSys '19, New York, NY, USA

  Acceptance Rate: 40 / 131 (31%)

- Andersen, M. P., Kumar, S., AbdelBaky, M., **Gabe Fierro**, Kolb, J., Kim, H.-S., Culler, D. E., and Popa, R. A. (2019). WAVE: A Decentralized Authorization Framework with Transitive Delegation. In *28th USENIX Security Symposium (USENIX Security 19)*, Santa Clara, CA

  Acceptance Rate: 113 / 697 (16%)

- **Gabe Fierro**, Pritoni, M., AbdelBaky, M., Raftery, P., Peffer, T., Thomson, G., and Culler, D. E. (2018). Mortar: An Open Testbed for Portable Building Analytics. In *Proceedings of the 5th Conference on Systems for Built Environments*, BuildSys '18, Shenzen, China (**Best Presentation Award**)

  In Top 5 papers of conference Acceptance Rate: 23 / 62 (37%)

- **Gabe Fierro** and Culler, D. (2017). HodDB: Design and Analysis of a Query Processor for Brick. *Proceedings of The 4th International Conference on Systems for Energy-Efficient Built Environments (BuildSys '17)*

  Acceptance Rate: 30 / 96 (31%)

- Balaji, B., Bhattacharya, A., **Gabe Fierro**, Gao, J., Gluck, J., Hong, D., Johansen, A., Koh, J., Ploennigs, J., Agarwal, Y., Bergés, M., Culler, D., Gupta, R. K., Kjærgaard, M. B., Srivastava, M., and Whitehouse, K. (2016a). Brick: Towards a unified metadata schema for buildings. In *Proceedings of the 3rd ACM International Conference on Systems for Energy-Efficient Built Environments*. ACM (**Audience Choice Award - Best Paper Finalist**)

  Acceptance Rate: 48 / 98 (49%)

- Andersen, M. P., **Gabe Fierro**, and Culler, D. E. (2016). System Design for a Synergistic, Low Power Mote/BLE Embedded Platform. In *15th ACM/IEEE International Conference on Information Processing in Sensor Networks*, IPSN '16

  Acceptance Rate: 21 / 117 (18%)

- Dawson-Haggerty, S., Krioukov, A., Taneja, J., Karandikar, S., **Gabe Fierro**, Kitaev, N., and Culler, D. (2013). Boss: Building operating system services. In *USENIX Symposium on Networked Systems Design and Implementation*, NSDI '13

  Acceptance Rate: ($\approx$ 18%)

Journal Publications

- **Gabe Fierro**, Koh, J., Nagare, S., Zang, X., Agarwal, Y., Gupta, R. K., and Culler, D. E. (2020a). Formalizing Tag-Based Metadata With the Brick Ontology. *Frontiers in Built Environment*, Vol 6

- Krishnan Prakash, A., Zhang, K., Gupta, P., Blum, D., Marshall, M., **Gabe Fierro**, Alstone, P., Zoellick, J., Brown, R., and Pritoni, M. (2020). Solar+ Optimizer: A Model Predictive Control Optimization Platform for Grid Responsive Building Microgrids. *Energies*, Vol 13(12)

- **Gabe Fierro** and Culler, D. E. (2019b). Mortar: An Open Testbed for Portable Building Analytics. *ACM Transactions on Sensor Networks*, Vol 16(1)

- **Gabe Fierro** and Culler, D. E. (2018). Design and Analysis of a Query Processor for Brick. *ACM Transactions on Sensor Networks*, Vol 14(3–4)

- Andersen, M. P., **Gabe Fierro**, and Culler, D. E. (2017). Enabling synergy in IoT: Platform to service and beyond. *Journal of Network and Computer Applications*, Vol 81

- Balaji, B., Bhattacharya, A., **Gabe Fierro**, Gao, J., Gluck, J., Hong, D., Johansen, A., Koh, J., Ploennigs, J., Agarwal, Y., Bergés, M., Culler, D., Gupta, R. K., Kjærgaard, M. B., Srivastava, M., and Whitehouse, K. (2018). Brick : Metadata schema for portable smart building applications. *Applied Energy*, Vol 226

- Andersen, M. P., Kolb, J., Chen, K., **Gabe Fierro**, Culler, D. E., and Katz, R. (2018). Democratizing Authority in the Built Environment. *ACM Transactions on Sensor Networks*, Vol 14(3–4)

Workshop Publications

- **Gabe Fierro**, Moffat, K., Pakshong, J., and von Meier, A. (2020b). An Extensible Software and Communication Platform for Distributed Energy Resource Management. In *Proceedings of the IEEE Workshop on Autonomous Energy Grids*, SmartGridComm '20, Virtual Conference

- **Gabe Fierro**, Guduguntla, S., and Culler, D. E. (2019a). Dataset: An Open Dataset and Collection Tool for BMS Point Labels. In *Proceedings of the 2nd Workshop on Data Acquisition To Analysis*, DATA '19, New York, NY, USA

- Krioukov, A., **Gabe Fierro**, Kitaev, N., and Culler, D. (2012). Building Application Stack (BAS). In *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings*, BuildSys '12, Toronto, Ontario, Canada (**Best Paper Award**)

Demos and Posters

- **Gabe Fierro**, Prakash, A. K., Mosiman, C., Pritoni, M., Raftery, P., Wetter, M., and Culler, D. E. (2020c). Demo Abstract: Interactive Metadata Integration with Brick. In *Proceedings of the 7th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, BuildSys '20, Virtual Event, Japan
- **Gabe Fierro** and Culler, D. E. (2019a). An Improved API and User Experience for the Mortar Testbed. In *Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, BuildSys '19, New York, NY, USA
- Balaji, B., Bhattacharya, A., **Gabe Fierro**, Gao, J., Gluck, J., Hong, D., Johansen, A., Koh, J., Ploennigs, J., Agarwal, Y., Bergés, M., Culler, D., Gupta, R. K., Kjærgaard, M. B., Srivastava, M., and Whitehouse, K. (2016b). Portable Queries Using the Brick Schema for Building Applications: Demo Abstract. In *Proceedings of the 3rd ACM International Conference on Systems for Energy-Efficient Built Environments*, BuildSys '16, Palo Alto, CA, USA (**Best Demo Award**)
- **Gabe Fierro**, Rehmane, O., Krioukov, A., and Culler, D. (2012). Demo Abstract: Zone-Level Occupancy Counting with Existing Infrastructure. In *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings*, BuildSys '12, Toronto, Ontario, Canada

Teaching Experience

Graduate Teaching Assistant, CS 186: Introduction to Database Systems (Fall 2020)
Graduate Teaching Assistant, CS 168: Design of Microprocessor Based Systems (Fall 2018)
Teaching Assistant, CS 194: Internet of Everyday Things (Spring 2015)
Lead Instructor and Course Developer, IEOR 290C: Introduction to Data Science (Summer 2014)

Past Employment

Research Staff — Computer Science Dept, UC Berkeley September 2014 - August 2015

Primary developer on a Department of Energy grant to develop an open building automation system. Assisted then-current PhD students with research projects and helped maintain the sMAP software platform, used by researchers to store and annotate physical telemetry.

Lab Manager — Coleman Fung Institute, UC Berkeley September 2012 - September 2014

Led the design and implementation of the largest curated dataset of US patents and patent applications. Worked with Economics reseachers to develop APIs and data cleaning techniques to facilitate research on innovation. Advisied undergraduate and Masters students in curating and using the dataset for their own capstone projects. Developed and taught a Data Science course (IEOR 290C)