

# SERGIO CASTELLANOS

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## Education

- 2015 **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**, Cambridge, MA, USA  
Ph.D., M.Sc., Mechanical Engineering  
Minor studies: Energy Policy and Economics; Data and Spatial analysis
- 2008 **THE UNIVERSITY OF ARIZONA**, Tucson, AZ, USA  
B.Sc., Mechanical Engineering (Magna Cum Laude)

## Academic Experience

- 2017– **UNIVERSITY OF CALIFORNIA, BERKELEY**, California Institute for Energy & Environment, Berkeley, CA, USA  
Assistant Professional Researcher  
2019 Data Science Fellow at UC Berkeley’s Data for Social Sciences Lab (D-Lab)  
Director, Berkeley–Mexico Energy & Climate Change Initiative
- Research agenda focused on developing data-driven tools for sustainable infrastructures, transportation, and energy systems planning through environmental justice lens.
  - Direct institute efforts between Berkeley and Mexico, managing 5 projects for a total budget of \$3.7 M (USD) to study renewable energy technologies, grid-integration policies, low-carbon transportation and carbon capture studies.
- 2016–2017 Berkeley Energy & Climate Initiative; Renewable and Appropriate Energy Laboratory  
BECI–ITESM Energy Research Fellow  
Advisors: Prof. Daniel M. Kammen, Prof. Paul K. Wright, Dr. Carl Blumstein (Jan ‘16–Oct ‘17)
- Develop open-source model to optimize for low cost investment in power generation and transmission assets in the electric grid.
  - Analyzing the opportunities along the value chain in solar photovoltaic manufacturing in Mexico via techno-economic and supply chain models.
- 2009–2015 **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**, Cambridge, MA, USA  
Graduate Research Assistant; Postdoctoral Research Associate
- Co-authored 13 peer-reviewed articles, filed for a patent, selected as journal reviewer, and presented at 11 technical conferences and workshops.
  - Lead R&D collaboration between Mexico-USA, involving 5 PIs, government officers, and a consulting agency, for a total approved budget of \$600 K (USD) to study thin-film solar cells.
  - Co-organized the 1<sup>st</sup> workshop “Solar Energy Tech & Innovation in Mexico ‘15” in Mexico.

## Selected Relevant Journal Publications (Extensive list at <http://tinyurl.com/SCastellCitations>)

D.A. Sunter, **S. Castellanos**, D.M. Kammen, “Race to solar deployment: Disparities in Rooftop Photovoltaics Deployment in the United States by Race, Ethnicity and Income”, *Nature Sustainability* (DOI: 10.1038/s41893-018-0204-z, 2018).

**S. Castellanos**, J.E. Santibáñez-Aguilar, B.B. Shapiro, D.M. Powell, I.M. Peters, T. Buonassisi, D.M. Kammen, A. Flores-Tlacuahuac, “Sustainable silicon photovoltaics manufacturing in a global market: a techno-economic, tariff, and transportation framework”, *Applied Energy*, **212**, 704-719 (2018).

**S. Castellanos**, D.A. Sunter, D.M. Kammen, “*Rooftop solar photovoltaic potential in cities: how scalable are assessment approaches?*”, *Environmental Research Letters*, **12**, 125005 (2017).

**S. Castellanos**, K.E. Ekstrøm, A. Autruffe, M.A. Jensen, A.E. Morishige, J. Hofstetter, P. Yen, B. Lai, G. Stokkan, C. del Cañizo, T. Buonassisi, “*High-performance and traditional multicrystalline silicon: comparing gettering responses and lifetime-limiting defects*”, *IEEE Journal of Photovoltaics*, **6**, (3), 632-640 (2016).

**S. Castellanos**, T. Buonassisi, “*Dislocation density reduction limited by inclusions in kerfless high-performance multicrystalline silicon*”, *Phys. Status Solidi RRL* **9**, 503-506 (2015).

**S. Castellanos**, M. Kivambe, J. Hofstetter, M. Rinio, T. Buonassisi, “*Variation of etch-pit geometry: An indicator of bulk microstructure and recombination activity in multicrystalline silicon*”, *Journal of Applied Physics* **115**, 183511 (2014).

### **Selected Conference Proceedings**

**S. Castellanos**, A. Pasos-Trejo, P. Sánchez-Pérez, M. Torres, A. Monroy-Tellez, J. Johnston, A. Jain, F. James-Langer, D. Ponce de Leon, D.M. Kammen, “*Modeling high penetration of solar PV and renewables in the grid: A case for México*”, *45<sup>th</sup> IEEE Photovoltaic Specialists Conference*, Waikoloa, HI (2018).

**S. Castellanos**, J.E. Santibáñez-Aguilar, B.B. Shapiro, D.M. Powell, I.M. Peters, T. Buonassisi, D.M. Kammen, A. Flores-Tlacuahuac, “*Sustainable silicon photovoltaics manufacturing in a global market: a techno-economic, tariff, and transportation framework with an applied case for México*”, *45<sup>th</sup> IEEE Photovoltaic Specialists Conference*, Waikoloa, HI (2018).

D. Sunter, J. Dees, **S. Castellanos**, D. Callaway, D.M. Kammen, “*Political Affiliation and Rooftop Solar Adoption in New York and Texas*”, *45<sup>th</sup> IEEE Photovoltaic Specialists Conference*, Waikoloa, HI (2018).

### **Honors and Awards**

- 1<sup>st</sup> place – Grand Prize-winning team, *United Nations Global Pulse: Data for Climate Action Challenge*, International competition (out of 450 participants), for work on Electro-mobility solutions for Mexico City, 2017
- Awarded +\$15 K (USD) in equipment donation by WesternDigital Company to pursue Electro-mobility research.
- 1<sup>st</sup> place – Winning team, *Berkeley Energy and Resources Collaborative’s Cleanweb Hackathon*, Work on solutions to reduce acquisition costs for solar rooftop PV, 2016
- BECI-ITESM Energy Fellowship, 2016–2018
- 2<sup>nd</sup> place – *MIT Mechanical Engineering de Florez Award Competition (Graduate Science Category)*, 2015
- Best Poster Award – *IEEE Photovoltaic Specialist Conference*, 2014
- Co-President – *MIT Mexican Students Association*, 2012–2014
- Co-Chair – Alumni and External Relations, *MIT Energy Club*, 2014–2015
- Chair – Solar Community, *MIT Energy Club*, 2012–2014
- Student Recognition Award – *Crystalline Silicon Solar Cells Workshop*, 2013
- Roberto Rocca Fellowship (1 out of 12 from a total of 7 countries), 2010
- Director – Energy Night Content, *MIT Energy Club*, 2009
- MIT Conflict Manager (Certified)
- Liaison – “*Clubes de Ciencia*” (*International educational organization*) responsible for raising \$5K (USD)
- German Academic Exchange Service (DAAD) Fellowship for research on organic/inorganic solar cells in Duisburg-Essen University, 2008
- EPA’s “P3” Participant. Technical Lead: built a solar-powered magnetohydrodynamic generator, 2008
- DOE’s International “Solar Decathlon” Participant. Engineering Lead: sized energy loads in sustainable house, 2008
- Founder – Non-profit organization (PROGRESOL) distributor of solar-based cooking ovens in rural Mexico, 2007

## Referee

- International Panel on Climate Change – Expert reviewer for the Special Report on Global Warming of 1.5°C.
- Journals: Energy Policy, Applied Energy, IEEE Journal of Photovoltaics, Advanced Sustainable Systems, American Institute of Physics (AIP) Advances, Crystals, Applied Sciences, Energies, Physica Status Solidi a, Solar Rapid Research Letters
- Institutional Reports: National Renewables Energy Lab (NREL), REN21's Renewables Global Status Report.

## Teaching and Mentoring

### UNIVERSITY OF CALIFORNIA, BERKELEY

#### Mentoring

- M.Sc. Thesis committee member for Energy Engineering student's defense at Tec de Monterrey, México, 2017.
- M.Sc. Thesis co-advisor for Electrical Engineering and Computer Science student at UC Berkeley, 2017–2018.
- Research Lead for United Nation's "Data for Climate Action Challenge" Grand Prize Winning team on electro-mobility, and in partnership between UC Berkeley and Mexico's Institute for Ecology and Climate Change, 2017.
- Research mentor for 3 master students, 23 undergraduate students and 1 high school student on energy, transportation, and environmental justice projects, 2016–2018.
- Raised \$21K (USD) for students' internship financial support, 2016–2017.

#### Teaching

- Energy & Resources Group (ERG) and Goldman School of Public Policy  
*Energy and Society* (Prof. Daniel Kammen); Guest Lecturer: "Environmental Justice" (2017), "Solar Energy" (2018).
- Reviewer for 2 online teaching classes (mini massive open online courses) focused on (1) Sustainable energy transition, and (2) Solar PV technologies, at <https://minimoocs.clubesdeciencia.mx>, 2017.

### MASSACHUSETTS INSTITUTE OF TECHNOLOGY

#### Mentoring

- MIT 2.626 "Fundamentals of Photovoltaics". Final class project mentor for 8 students on "Solar PV implementation in Mexico". Presented results to government officials, 2014.

## Non-Academic Experience

- 2017–  
2017–  
2017  
Fall  
2015  
Summer  
2014  
Summer
- Office of Science and Technology Information for Mexico's Congress of the Union (INCYTU)**  
*Technical, Scientific, and Policy Analyst*
- Develop scientific-based reports on renewable energy, climate change mitigation, and sustainability topics to Mexico's Legislative Chamber to support the establishment of data-driven public policies.
- Working Group: "National Priorities on R&D, Technical and Human Resource Development to Reduce Fuel Consumption in Cities"** lead by Centro Mario Molina, Mexican Institute of Petroleum, and Renewable Energies Institute  
*Member and Panelist*
- Contributed in strategy discussions for establishing national R&D priorities for sustainable cities development in Mexico.
- Mexico's National Energy Museum – Museo Nacional de Energía y Tecnología (MUNET)**  
*Consultant to the Planning Committee*
- Recommended solar energy-related content to be implemented in Mexico's National Energy Museum (to be opened in 2018), given current, and future techno-economic projections.
- Mexico's Department of Energy – Secretaría de Energía de México (SENER)**, Ciudad de México, México  
*Advisor to the Energy Planning and Transition section of the Mexican Energy Secretariat*

- Supported drafting the vision, objectives and research thrusts of two national research centers focused on Bioenergy and Ocean energy, with approved budgets of above \$60 M (USD).

2008  
Fall **GLHN Architects & Engineers, Inc.**, Tucson, AZ, USA  
*HVAC Engineering Intern*

- Estimated building load consumptions and, through data-driven analysis, proposed a variety of energy-efficient equipment to be installed. Interacted in a multidisciplinary and fast-paced team.

2008  
Summer **Technicians for Sustainability, LLC.**, Tucson, AZ, USA  
*Solar PV Systems Installer*

- Installed rooftop PV systems in residential and commercial buildings.

### Selected Invited Talks

- “Clean Transportation and Climate Impact: The Case for Electric-mobility in CDMX”. Keynote Speaker. *MIREC WEEK CONFERENCE 2018, Mexico City, Mexico.*
- COP23 International Renewable Energy Agency (IRENA) session on “Transport, Renewables & Climate: The Case for Electric-mobility in Mexico City”. *COP23 Conference of the Parties, 2017, Bonn, Germany.*
- “Electro-mobility: Cleaning Mexico City’s Air with Transformational Climate Policies through Big Data Pattern Analysis in Traffic and Social Mobility”. *Working Group: Identifying National Priorities on R&D, Technical and Human Resource Development to Reduce Fuel Consumption in Cities, 2017, Mexico City, Mexico.*
- “SWITCH–Mexico: Open Access Platform to Plan the National Electric Grid with High Penetration of Renewable Energy”. *Dialogues for the Future of Mexico’s Energy Sector (DEMEX), 2017, Mexico City, Mexico, and National Renewable Energy Laboratory (NREL).*
- “Latest Events and Future Projections for the Solar Photovoltaics Manufacturing Sector”. Panel Discussion. *MIREC WEEK CONFERENCE 2017, Mexico City, Mexico.*
- “Solar Energy Worldwide and Future Prospective in Mexico amidst the Energy Reform”. *Grupo Fenosa, 2017, Mexico City, Mexico.*
- “Quantitative Residual Stress Imaging of Multicrystalline, Quasi-Mono, and Thin Kerfless Silicon Wafers by Infrared Birefringence and Sectioning”. *IEEE Photovoltaic Specialists 2014 Conference, Denver, CO.*

### Continuing Education

- 2017 **FORM+FUND Certificate Workshop on Startups and Innovation by Startup@BerkeleyLaw**
- *Startup and Innovation Principles workshop series:* Studied best practices to form startups and raise capital to bring academic ideas to the real world.
- 2017 **S&P Global Market Intelligence: “Analyst in the Power and Gas Sectors”**, NYC, New York, USA
- *Immersive power and energy markets analysis training course:* Studied industry performance metrics, energy market drivers, and factors impacting diverse value chains segments.
- 2015 **Harvard School of Arts and Science’s with Harvard Business School: Mini-MBA**, Cambridge, MA, USA
- *Immersive mini-MBA program:* Case-based set of 11 sessions on Finance, Operations, Economics, Strategy, Accounting, Ethics, Marketing, and Organizational Behavior.

### Media Coverage

- Postdoctoral work on Big Data & Electro-mobility recognized by UN and featured in news media online, including “Businesswire”, “Wired Insider”, “Datamakespossible”, “El Financiero”, “UN GlobalPulse”, and “Udacity Blog”.
- Coverage of Ph.D. research work featured in 40+ news media globally, including “Phys.org”, and “Solar Novus”.

## **Other Skills**

- Languages: Fluent in English and Spanish; Elementary French and German.
- Emergency Medical Technician (Volunteer):
  - PHTLS certified, Aquatic Rescue Squad member, and automobile-trapped 'Jaws of Life' tool operator.