

EDGAR VIRGÜEZ, Ph.D.

260 Panama Street, Carnegie Institution for Science, Stanford University
Stanford, California, United States
evirguez@carnegiescience.edu | <http://sites.duke.edu/edgarvirguez/>

Education

DUKE UNIVERSITY, Nicholas School of the Environment Durham, NC, United States
Doctor of Philosophy, Environmental Sciences and Policy (GPA: 3.97/4.00) January 2022
Master of Arts, Environment (Energy and Environment) (GPA: 3.97/4.00) July 2018

Select Scholarships: Provost Fellow (2020-2021); Energy Transition Fellow (2020); Energy Doctoral Student Fellow (2019-2021); Bass Digital Education Fellow (2019-2020); Energy Data Analytics Ph.D. Fellow (2018-2019); Rodolfo Llinas Fellow (2016-2020); Nicholas School Ph.D. Scholar (2016-2022)

Select Awards: Duke University 2022 Commencement Student Speaker (finalist) (2022); Duke's LatinX Awards: Excellence in Activism Award (2022), American Association of Geographers EESG Best Student Paper (2022) and Advancing Diversity and Inclusion Award (2021); Forever Duke Student Leadership Award (2021); Graduate/Professional Academic Wizard of the Year (2021); Graduate School Dean's Award for Excellence in Teaching (2021); K Patricia Cross Future Leader Award (2020); Columbia University's 13th Annual Energy Symposium competition (2018); The Economist's Which MBA? & NRG Energy People Choice Award (2017)

Select Leadership Roles:

Board of Trustees: Board Member (Young Trustee) (2022-2025); Resources Committee (2019-2021); Strategic Task Force: Activating the Global Network (2018-2019)

Institutional Search Committees: Senior Associate Dean for International Students (2021-2022); Executive Vice President (2019-2020); Assistant Vice President for Student Affairs (2020)

Institution-wide Committees: Carbon Offsets Advisory Committee (2021-2022); Racial Equity Advisory Council (2021-2022); Graduate and Professional Students' Housing Working Group (2021); International Students Support Committee (2021)

Graduate School Committees: Graduate and Professional Student Advisory Board (2020-2021); Graduate Student Affairs Advisory Committee (2018-2021); NSOE Doctoral Programs Advocacy Council (2017-2021)

UNIVERSIDAD DE LOS ANDES (Uniandes), School of Engineering Bogotá, Colombia
Master of Science, Environmental Engineering (GPA: 4.7/5.0) December 2010
Bachelor of Science, Environmental Engineering (GPA: 4.2/5.0) May 2009
Bachelor of Science, Chemical Engineering (GPA: 4.2/5.0) May 2009

Select Scholarships and Awards: Maximum Distinction for Graduate Studies (2011); Procter & Gamble Prestige Award (2008); Expoandes, Best Social Development Project & Best Project Presentation, Uniandes (2003).

Overall: awarded nine [scholarships and fellowships](#), adding to \$766,115, and twenty [professional honors and awards](#) with associated prices of \$33,365.

Professional, Research & Teaching Experience (last five years)

DUKE UNIVERSITY Durham, NC
Trustee (Board Member) July 2022 (Currently)

- Acted as a university fiduciary responsible for procuring Duke's long-term health, overseeing and aligning its strategic direction, educational policy, finances, and operations with its mission.
- Selected as a board member (Young Trustee) of Duke University's highest governing body, the Board of Trustees, appointed from July 2022 to June 2025.
- Identified as an emerging leader with the qualities necessary to act as a university fiduciary, selected as the 22nd Young Trustee from the graduate and professional community in the institution's history.
- Recognized as an individual of outstanding character, ability, and vision from the current ~10,000 graduate and professional student body and ~8,000 graduate or professional alums of Duke's Class of 2021 and 2022.
- Appointed to the Board of Trustees:
 - Graduate and Professional Education and Research Committee from 2022 to 2023 as one of the nine trustees (including a Nobel Prize laureate) on the committee, along with three *ex officio* members (including Duke's former Provost, Sally Kornbluth, now MIT's President).

- External Engagement Committee from 2023 to 2024 as one of the nine trustees on the committee, acting as a strategic forum to review, assess, and advance issues related to the university's external relations (including its upcoming multi-billion-dollar philanthropic campaign).
- Committee on Honorary Degrees from 2023 to 2024 as one of the five trustees (including a Nobel Prize laureate), awarding honorary degrees to affirm the university's vital interest in and connection with excellence in any valued aspect of human endeavor.
- Invited as one of the fourteen members of Duke's Climate Commitment Task Force tasked with analyzing and assessing the scope, scale, feasibility, timing, and structure of the university-wide campaign initiative on climate.
- Selected as the chair of the Young Trustee Nominating Committee (2023-2024), overseeing the screening, interviewing, assessment, and nomination process of the Graduate/Professional Young Trustee candidates to provide a recommendation on one Young Trustee to Duke University's President.

CARNEGIE INSTITUTION FOR SCIENCE (STANFORD UNIVERSITY)

Biosphere Sciences & Engineering Division

Stanford, CA

Postdoctoral Research Scientist and Deputy Group Leader

February 2022 (Currently)

- Performed idealized modeling studies (e.g., macro-energy, integrated assessment, climate, and carbon-cycle modeling) to address climate and energy challenges, working under the supervision of Ken Caldeira, Senior Scientist (emeritus) at Carnegie Institution for Science, Stanford University, and Gates Venture.
- Disseminated research findings (7 published papers, 10 under review, and 9 under preparation) in high-quality scientific journals (e.g., *Energy & Environmental Sciences* and *One Earth*) addressing climate and energy challenges.
- Published op-eds and letters in high-impact media like *Science* (including one letter featured on the main cover and one letter highlighted in *Science's* weekly podcast) and *Inside Higher Ed*, promoting necessary reforms to achieve an energy transition in the US and higher education institutions that advance their research mission while building inclusive and diverse environments.
- Appointed as an Executive Editorial Board member of the *Environmental Research: Energy* journal. Recognized as a prominent scientist in the energy field, tasked with giving the journal its scientific authority, providing the publishing team with intelligence on the latest scientific and technological developments, and advocating for the journal within scientific communities.
- Acted as the group manager, advising on strategic hiring, coordinating the group logistics, and procuring for medium- and long-term sustainability by over-viewing the annual budget.
- Co-designed, planned, and executed the first three strategic research and development planning sessions (including research collaborators from the California Institute of Technology (Caltech) and the University of California, Irvine). Sessions were designed around three components: a) strategic research, b) team building, and c) manuscript writing.
- Selected to the eight-member Carnegie Task Force: Additive Brand Refresh, tasked with clarifying the institution's brand strategy and story to increase the understanding of its unique position and the differential value from peer organizations. Recognized as an exemplary researcher from the Department of Global Ecology, tasked with representing early-career researchers in the 2022 annual meeting of Carnegie's Board of Trustees.
- Identified as an emerging higher-education leader invited by:
 - The Earthshot Prize (led by Prince William of Gales) as a member of the Expert Advisory Panel tasked with reviewing Earthshot nominations for their impact potential, uniqueness, and innovation.
 - The National Academy of Sciences, Engineering, and Medicine (NASEM) and the Association of American Universities (AAU) to discuss the state and future of graduate mentorship in higher education;
 - The Sloan Foundation and Resources for the Future (RFF) to inform decision-making on the intersection of energy and climate policy.

DUKE UNIVERSITY

Durham, NC

Research Associate, Nicholas School of the Environment (NSOE)

August 2016 - January 2022

- Programmed three analytical tools simulating: i) the production-cost process (day-ahead unit commitment and real-time economic dispatch models) to serve electricity demand of a service region including thermal generation assets, hydroelectric dams, and battery energy storage; ii) an availability and suitability analysis of utility-scale photovoltaic projects that account for zoning ordinances (including a user-friendly ArcGIS Pro siting tool); and iii) the geospatial and temporal evolution of generators' outages during ERCOT's energy crisis. Published research findings from their application in six journal papers and one conference proceeding.
- Awarded scholarships for more than \$250,000 (external resources) to complement the internal scholarship received by the Nicholas School of the Environment. Designated as a Rodolfo Llinas Scholar, an Energy Data Analytics Fellow, an Energy Doctoral Student Fellow, a Bass Instructional Fellow, and a Provost Fellow.

- Selected as a board member (Young Trustee) of Duke University's highest governing body, the Board of Trustees. Recognized as an individual of outstanding character, ability, and vision from the current ~10,000 graduate and professional student body and ~8,000 graduate or professional alums of Duke's Class of 2021 and 2022. Identified as an emerging leader with the qualities necessary to act as a university fiduciary responsible for procuring Duke's long-term health, overseeing and aligning its strategic direction, educational policy, finances, and operations with its mission.
- Served in multiple leadership positions at the school level (e.g., Nicholas School Ph.D. Advocacy Council Co-President serving ~7% of all Duke Ph.D. Students) and institutional level (e.g., Board of Trustees Resources Committee), promoting the enhancement of the educational experience at Duke. Appointed to the search committee for three senior positions at the central administration, including the search committee for the Executive Vice President (Duke University's Chief Administrative and Financial Officer).
- Mentored undergraduate and graduate students who self-identified as members of minority groups (e.g., Latinos) and early-career practitioners in the energy and environment field. Designed a guide to establish or refine a structure to support peer-to-peer mentoring for doctoral students at Duke. Nominated (~27 nominations) for Duke's highest mentoring award for graduate students, the Graduate School Dean's Award for Excellence in Mentoring.
- Promoted an increased interaction between domestic and international students, founding member of the Nicholas School Global Connections Initiative. Proposed and accompanied the design and implementation of a collaborative agreement between Fundación para el Futuro de Colombia (COLFUTURO) and the Nicholas School of the Environment to foster cooperation through the provision of resources for Colombian graduate students (being this just the second school-specific agreement with a Latin American country).
- Represented the university at two national study-case energy competitions, achieving a 100% success rate by winning a top prize in both participations.

Instructor of the Record, NSOE and Trinity College of Art & Sciences 2017-2020

- Redesigned a course to introduce two pedagogical strategies for achieving vibrant inclusiveness in classroom settings with diverse student populations: a) enabling engagement through authentic assessments, and b) introducing global learning that draws on students' cultural heritage (service-learning components). Following positive student reception after the course redesign, the university launched new course sections in three additional languages (i.e., Chinese, French, and German).
- Published recommendations from the course redesign in two book chapters that provide practical pedagogical tips for graduate students and analyze the role of language and culture in the broader discussion of education for sustainability.
- Rated as one of the best teachers (top 5%) in undergraduate programs at Duke in Fall 2020 (4.57/5.00 instructor rate). Recognized as a next-generation instructor exemplifying the characteristics of effective college teaching impacting the experience of undergrad and graduate students, receiving awards for contributions to teaching and higher education: Duke's most distinguished teaching award for graduate students, the Graduate School Dean's Award for Excellence in Teaching, and the prestigious K. Patricia Cross Future Leader Award by the Association of American Colleges and Universities (AAC&U).
- Advocated for projects that support an enhanced experience for underrepresented groups (e.g., first-generation students) and promote inclusive pedagogical practices. Authored a university-wide resolution adopted by the Graduate and Professional Student Council to remove the GRE as a mandatory admission requirement. Co-sponsored the addition of a new bylaw to prevent hate and bias actions in the student body.

Recent Publications (selected over the last three years)

-
- Antonini, E., **Virguez, E.**, Ashfaq, S., Duan, L., Ruggles, T., & Caldeira, K. (2024). Identification of reliable locations for wind power generation through a global analysis of wind droughts. *Communications Earth & Environment*. **Journal Article**. <https://doi.org/10.1038/s43247-024-01260-7>
 - Li, M., Shan, R., Abdulla, A., **Virguez, E.**, & Gao, S. (2024). The role of dispatchability in China's power system decarbonization. *Energy & Environmental Science*. **Journal Article**. <https://doi.org/10.1039/d3ee04293f>
 - **Virguez, E.**, Leon, L., & Freese, L. (2024). The climate sciences need representation from the Global South. *One Earth*. **Commentary**. <https://doi.org/10.1016/j.oneear.2024.01.016>
 - Li, M., Shan, R., Abdulla, A., **Virguez, E.**, & Gao, S. (2024). The role of dispatchability in Chinese power system decarbonization. *Energy & Environmental Science*. **Journal Article**. <https://doi.org/10.1039/d3ee04293f>
 - Singh, G., ... (et al.), **Virguez, E.**, Kirshner, S., Xu, C., & Sharma, V. (2024). Changing outdated expectations. *Science*. **Letter**. <https://doi.org/10.1126/science.adn4211>
 - Suresh, M., Wagnon, J., Hall, T., Campos, R., Wakio, S., **Virguez, E.** & Sperling, J. (2024). Reframing international students' success: Institutional responsibility for international student wellbeing and belongingness.

Supporting College Students of Immigrant Origin: New Insights from Research, Policy, and Practice. Cambridge: Cambridge University Press. ISBN: 978-1-00940-824-0. **Book Chapter**.

- Zuming, L., Li, M., **Virguez, E.**, & Xie, X. (2023) Low-carbon transition pathways of power systems for the Guangdong-Hongkong-Macau Region in China. *Energy & Environmental Science*. **Journal Article**. <https://doi.org/10.1039/d3ee02181e>
- Schmitt, R., **Virguez, E.**, Ashfaq, S., & Caldeira, K. (2023). Move up or move over: Mapping opportunities for climate adaptation in Pakistan's Indus plains. *Environmental Research Letters*. **Journal Article**. <https://doi.org/10.1088/1748-9326/acfc59>
- Bismuth, K., (et al.), **Virguez, E.**, Zhi, Y., & Dedyo, J. (2023). Historic introductions. *Science*. **Letter**. <https://doi.org/10.1126/science.adk8769>
- Heim, B., (et al.), **Virguez, E.**, Strielkowski, W., & Uzonyi, A. (2023). AI in search of human help. *Science*. **Letter**. <https://doi.org/10.1126/science.adi8740>
- Amorim, C., **Virguez, E.**, (et al.), & Chugh, M. (2023). The future of scientific societies. *Science*
- Dioha, M., Lukuyu, J., **Virguez, E.**, & Caldeira, K. (2022). Guiding the deployment of electric vehicles in the developing world. *Environmental Research Letters*. **Journal Article**. <https://doi.org/10.1088/1748-9326/ac765b>
- **Virguez, E.** (2022). How I balanced my Ph.D. research with opening doors for others. *Science*. **Op-ed**. <https://doi.org/10.1126/science.abq8440>
- Li, M., **Virguez, E.**, Shan, R., Tian, J., Gao, S., & Patino-Echeverri, D. (2021) High-resolution data shows China's wind and solar energy resources are enough to support a 2050 decarbonized electricity system. *Applied Energy*. **Journal Article**. <https://doi.org/10.1016/j.apenergy.2021.117996>
- **Virguez, E.**, Wang, X., & Patiño-Echeverri, D. (2021). Utility-scale photovoltaics and storage: Decarbonizing and reducing greenhouse gases abatement costs. *Applied Energy*, 282, 116120. **Journal Article**. <https://doi.org/10.1016/j.apenergy.2020.116120>

Overall publications: [seventeen peer-reviewed journal papers \(ten more under review and nine more under preparation\)](#), [four peer-reviewed conference proceedings](#), [one book](#), [three book chapters](#), and [eleven feature articles, op-eds, or scientific letters](#)

[Citations \(Google Scholar\): 440](#)

[h-index \(Google Scholar\): 12](#)

[i10-index \(Google Scholar\): 12](#)

Average impact factor of journals at the time of publication: 10.06

Certificates and Professional Programs

- **Certificate in college teaching**. 2022. Graduate School, Duke University
- **Emerging leaders institute**. 2019. Graduate School, Duke University
- **Geospatial analysis certificate program**. 2018. Nicholas School of the Environment, Duke University
- **Applying research for sustainable and inclusive growth: linking universities, industry, and government**. 2015. Department of Economic Development, Jobs, Transport and Resources, Australian Government
- **Innovating with sense**. 2015. Proa Consulting. Bogota, Colombia

Affiliation to Professional Associations

Air & Waste Management Association (A&WMA), American Association of Geographers (AAG), American Geophysical Union (AGU), Association of American Colleges & Universities (AAC&U), Institute for Operations Research and the Management Sciences (INFORMS), Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS).

Community Service (selected over the last five years)

Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) Mentor Activation for Students Program, Mentor (2024); Duke FIRSTS, Mentor (2018-2021); Ekpa'palek Empowering Latinos, Mentor (2019-2020); Nicholas School Global Connections Initiative, Academic Programs Student Leader (2017-2020).

Skills

Languages: Spanish (Native), English (Proficient – C1), French (Beginner - A1)

Software: ArcGIS, ArcGIS Pro, Aspen Plus, Crystal Ball, Homer, IBM ILOG Cplex, Matlab & Microsoft Office

Programming Languages: C, C++, OPL, Python, SQL & Visual Basic