Devin Todd, PhD, PEng

Victoria, BC | Tel: [redacted] | devin.g.z.todd@gmail.com | https://drtodd.github.io/DT-Portfolio/

Motivation

I work for a better world at the intersections of R&D, industry, policy, and community. As a deep generalist, I facilitate connections and partnerships that drive innovation and create enduring impact. Equally at home in the shop, boardroom, or town hall, I am committed to leading initiatives that value integrity, transdisciplinarity, and coproduction.

Skills Summary

Lead
- More than fifteen years of experience in research, start-up, and consulting capacities.
- Supporting partnerships encompassing diverse values, priorities, disciplines, and knowledges.
- Managing complex multilateral projects with evolving scope and inherent uncertainties.
- Growing organizations through strategic planning, relationship building, and business development.

Innovate
- Broad engineering expertise spanning cleantech and design.
- Techno-economic modelling, systems engineering, and project/technology assessment.
- Knowledge mobilization and communications product development for diverse audiences.

Build
- Design and fabrication using a host of software and CNC/manual processes.
- Sensing, data acquisition, and automation, using Arduino, NI, and custom tools.
- Data analysis using Excel, Matlab, Python, Jupyter Notebooks, etc.

Experience

Pacific Institute for Climate Solutions (PICS) — **Victoria, BC**
Researcher-in-Residence — **Mar. 2020 – Jun. 2024**
- Be BC's expert on climate change mitigation, carbon removal, and net-zero GHGs.
- Provided trusted and strategic guidance to industry actors, policymakers, political executives, and more.
- Built relationships connecting solutions seekers and providers. Championed action through coproduction.
- Deployed knowledge mobilization tools: briefings, invited talks, events, radio, newspapers, reports, etc.
- Led development of the BC public service's new foundational climate action training.

Solid Carbon Team Member
- Be the alliance manager for Solid Carbon, a multi-national carbon removal research partnership.
- Oversaw scoping and coordination across teams and disciplines. Carried the transdisciplinary lens.
- Executed the terms of reference on behalf of PICS, including vetting the financial management.
- Contributed to systems engineering research exploring system architectures and techno-economics.
- Co-developed public engagement workshops, inclusive of Env.-NGO and indigenous community members.

New Leaf Management Ltd. — **Vancouver, BC**
Mechanical Engineer — **Apr. 2016 – Feb. 2020**
- Co-led mechanical design for novel kite power and vertical axis wind turbine systems.
- Led partnership proposals, including negotiating an R&D roadmap with kite power's then largest player.
- Led techno-economic analysis of New Leaf and competitor solutions.
- Advised on business strategy evolution to reconcile investor, client, and team priorities.

Consultant (to New Leaf's Executive/Investor)
- Provided technical advice on investment opportunities in cleantech, energy, and carbon management.
- Evaluated sustainability, compiled risks, and screened for economic returns and fatal flaws.
- Facilitated communication between outcome-minded investors and technology-minded developers.
- Managed IP for New Leaf and affiliates, including patent drafting and prior-art analyses.

Experience Cont'd

UBC Department of Mechanical Engineering — **Vancouver, BC**
Graduate Student Researcher — **Sep. 2010 – Feb. 2016**
- Explored novel hardware, methods and materials to improve fuel cell performance.
- Led the entire R&D process, including design, budgeting, implementation, and reporting.
- Supervised junior students and staff, as well as managed laboratory systems and infrastructure.
- Supported the formation and execution of the $4.9 million UBC-Fraunhofer partnership in clean energy.

Formula SAE Team, UBC — **Vancouver, BC**
Senior Member — **Nov. 2006 – Aug. 2011**
- Designed and constructed an open-wheeled race car for the Formula SAE competition.
- Led the drivetrain group to success in a deadline driven project.

Robert Bosch GmbH – Corporate Sector Research — **Gerlingen, Germany**
CR/ARY3 Praktikant — **Jan. 2009 – Aug. 2009**
- Developed novel piezo sensors for critical-system application in harsh environments.
- Designed experiments to validate (successfully) sensor reliability and precision.

Powertech Labs Inc. — **Surrey, BC**
Energy Systems Co-op Education Student — **May 2008 – Aug. 2008**
- Fabricated H_2 vehicle fuelling and research infrastructure.
- Coordinated between fabrication and engineering teams.

Cellula Robotics Ltd. — **New Westminster, BC**
Engineering Data Analyst — **Sep. 2007 – Dec. 2007**
- Developed a program to produce bathymetry of a subsea mining prospect.
- Fused submersible telemetry from multiple sensors (e.g. inertial, sonar, depth).

UBC Department of Mechanical Engineering — **Vancouver, BC**
Undergraduate Research Assistant — **May 2007 – Aug. 2007**
- Reconstructed 3D models of paper-forming fabrics using microtomy.
- Refined and standardized the methods.

Education

University of British Columbia — **Vancouver, BC**
PhD Mechanical Engineering (leapfrogged MASc) — **Feb. 2016**

University of British Columbia — **Vancouver, BC**
BASc Mechanical Engineering with distinction (Thermofluids option, top graduate) — **May 2010**

Awards and Recognitions

Four Year Doctoral Fellowship (UBC, $18,200/yr) — **2013 – 2015**
NSERC PGS-D (Federal, $42,000) — **2013**
NSERC CGS-M (Federal, $17,500) — **2010**

Certifications

Engineers and Geoscientists British Columbia
Professional Engineer, #54617

Commercial Marine
SVOP, SDV-BS, ROC-M

Journal publications

- H. Norton, D. Todd, C. Crawford (2024) "Storage capacity estimates and site conditions of potential locations for offshore-wind powered carbon dioxide removal and carbon sequestration in ocean basalt". *Carbon Capture Science & Technology*. DOI: 10.1016/j.ccst.2024.100231
- Martin Scherwath, Kate Moran, David Goldberg, Curran Crawford, Terre Satterfield, Romany Webb, Jessica Stigant, Adedapo N. Awolayo, Benjamin M. Tutolo, Rachel Lauer, Eneanwan Ekpo Johnson, Devin Todd (2024) "Solid Carbon – a gigaton-scale ocean rock solid climate solution". *Proceedings of the 17th Greenhouse Gas Control Technologies Conference (GHGT-17) 20-24 October 2024*. DOI: 10.2139/ssrn.5069687
- H.M. Teicher, C.A. Phillips, D. Todd (2021) "Climate solutions to meet the suburban surge: leveraging COVID-19 recovery to enhance suburban climate governance". *Climate Policy*. DOI: 10.1080/14693062.2021.1949259
- D. Todd, W. Mérida. (2016) "Synthesis of transport layers with controlled anisotropy and application thereof to study proton exchange membrane fuel cell performance". *Journal of Power Sources*. DOI: 10.1016/j.jpowsour.2016.02.031
- D. Todd, S. Bennett, W. Mérida. (2016) "Anisotropic electrical resistance of proton exchange membrane fuel cell transport layers as a function of cyclic strain". *International Journal of Hydrogen Energy*. DOI: 10.1016/j.ijhydene.2016.02.111
- D. Todd, M. Schwager, W. Mérida. (2015) "Three-dimensional anisotropic electrical resistivity of PEM fuel cell transport layers as functions of compressive strain". *Journal of The Electrochemical Society*. DOI: 10.1149/2.0611503jes
- D. Todd, W. Mérida. (2015) "Morphologically controlled fuel cell transport layers enabled via electrospun carbon nonwovens". *Journal of Power Sources*. DOI: 10.1016/j.jpowsour.2014.09.095
- S.R. Dhanushkodi, M. Schwager, D. Todd, W. Mérida. (2014) "PEMFC durability: spatially resolved Pt dissolution in a single cell". *Journal of The Electrochemical Society*. DOI: 10.1149/2.1031412jes
- D. Todd, M. Schwager, W. Mérida. (2014) "Thermodynamics of high-temperature, high-pressure water electrolysis". *Journal of Power Sources*. DOI: 10.1016/j.jpowsour.2014.06.144

Other works

- D. Todd, et. al. (2024) "Climate Insights". A four-part eLearning course for the BC public service and the general public. https://pics.uvic.ca/resources/courses/
- D. Todd. (Nov 2022) "Negative emissions technologies are crucial if we are to limit global warming". Op-ed in The Globe and Mail. https://www.theglobeandmail.com/opinion/article-negative-emissions-technologies-are-crucial-if-we-are-to-limit-global/
- D. Todd. (Oct 2022) "Survive and Thrive Why BC needs a CO 2 removal strategy now". A report by the Pacific Institute for Climate Solutions. https://pics.uvic.ca/sites/default/files/PICS%20Report_Survive%20and%20Thrive%20Oct%202022.pdf
- D. Todd. (Mar 20, 2023) "The IPCC's newest report and carbon management in BC". Live interview on CBC's On the Island.
- D. Todd. (Nov 10, 2022) "On COP27 and mitigating emissions in BC". Live interview on CBC's On the Island.
- D. Todd. (Feb 17, 2021) "Episode 9: Sixty ways to hit "net zero" & Negative emissions technologies". Interview on the Smart Prosperity Institute podcast. https://institute.smartprosperity.ca/Podcast09
- S. Nawaz, D. Todd, S. Satterfield. (Feb 02, 2023) "Reviewer 2 does geoengineering: Breaking! DAC & public opinion". Interview on the Reviewer 2 podcast. https://podcasters.spotify.com/pod/show/reviewer2geoengineering/episodes/Breaking--DAC--public-opinion---Nawaz--Todd--Satterfield-e1ucd9r
- Columbia World Projects (Oct 2020) "Offshore Carbon Capture and Storage Opportunities and Challenges for CO2 Removal". Expert participant in Columbia's workshop. https://worldprojects.columbia.edu/sites/default/files/2021-05/Accelerating%20Offshore%20Carbon%20Capture%20and%20Storage%20Report.pdf
- F. Bourgault, D. Todd, J. Beatch, M. Kheiri, L. Damron, V. Saberi-Nasrabad. (2017) "Method and system for harnessing wind energy using a tethered airfoil", WO2018213913A1, filed July 17.
- W. Mérida, D. Todd, S. Bennett. (2015) "Electrical resistance characterization of porous conductive media layers", US provisional patent application 62/189,363, filed July 7.

Talks and Conferences

- Martin Scherwath*, Kate Moran, David Goldberg, Curran Crawford, Terre Satterfield, Romany Webb, Adedapo N. Awolayo, Benjamin M. Tutolo, Rachel Lauer, Eneanwan Ekpo Johnson, Devin Todd (Aug 2024) "Solid Carbon: Safe, durable and scalable geological carbon storage in the ocean crust" Presentation at the 37th International Geological Congress 2024, Busan, KR.
- B. Tutolo*, M. Scherwath, K. Moran, D. Goldberg, A. Awolayo, L. Coogan, C. Crawford, S. Dosso, E. Ekpo Johnson, R. Lauer, E. Louis, S. Nawaz, T. Satterfield, A. Slagle, D. Todd, R. Webb. (Apr 2023) "Solid Carbon: Safe and Durable Carbon Storage in Ocean Basalt - From Feasibility to Demonstration to Global Potential". Poster presentation at EGU General Assembly 2023, Vienna, AT. https://doi.org/10.5194/egusphere-egu23-16856, 2023.
- R. Webb*, M. Scherwath, K. Moran, D. Goldberg, C. Crawford, B. Tutolo, T. Satterfield, J. Stigant, D. Todd, and the Solid Carbon Team. (Apr 2023) "Solid Carbon: Offshore Negative Emission Technology for Durable Carbon Storage in the Ocean Crust". Presentation at Ocean Visions 2023. https://agu.confex.com/agu/OVS23/meetingapp.cgi/Paper/1226884
- M. Scherwath*, K. Moran, D. Goldberg, D. Awolayo, L. Coogan, C. Crawford, S. Dosso, E. Johnson, R. Lauer, E. Louis, T. Satterfield, A. Slagle, D. Todd, B. Tutolo, R. Webb. (Dec 2022) "Solid Carbon: Safe and Durable Carbon Storage in Ocean Basalt - From Feasibility to Demonstration to Global Potential". Poster presentation at AGU Fall Meeting 2022, Chicago, IL. https://agu.confex.com/agu/fm22/meetingapp.cgi/Paper/1130573
- H. Norton*, G. Avellaneda Domene, R. Foxall, P. Gillessen, D. Todd, C. Crawford. (Sep 2022) "Comparative technoeconomic analysis of a floating offshore wind powered direct-air CO2 capture system". Poster presentation at UMERC+METS 2022, Portland, OR.
- M. Scherwath*, B. Tutolo, D. Goldberg, E. Johnson, K. Khandelwal, R. Lauer, E. Louis, K. Moran, A. Slagle, E. Solomon, D. Todd. (May 2022) "Solid Carbon: A deep-sea CO2 mineralization demonstration project facilitated by IODP data and samples". Presentation at GAC-MAC-IAH-CNC-CSPG Joint Meeting, Halifax, NS. https://halifax2022.atlanticgeosciencesociety.ca/
- D. Todd*. (2021) "Pathways to net-zero". Invited talk at the Protect Our Winters (POW) Leadership Summit, Squamish, BC.
- H. Norton*, D. Todd, C. Crawford. (May 2021) "A global assessment of potential locations for offshore wind-powered direct air capture and storage". Presentation at Wind Energy Science Conference (WESC).
- D. Todd*, C. Crawford, D. Goldberg, K. Moran, T. Satterfield, M. Scherwath, B. Tutolo, R. Webb, and the Solid Carbon Team. (May 2021) "Solid Carbon: A Negative Emissions Technology for CO2 Removal from Air and Durable Storage in Sub-Seafloor Basalts". Poster presentation at Ocean Visions 2021 Summit.
- D. Todd*. (Apr 2021) "Putting the DAC in CCS: Pieces of the NETs Puzzle". Presentation at EnVision 2021 Conference, Victoria, BC.
- D. Todd*. (Apr 2021) "PICS, Solid Carbon, and NETs". Invited talk by EGBC's climate action working group.
- F. Bourgault*, D. Todd, M. Kheiri, J. Beatch, L. Damron, V. Saberi-Nasrabad. (Oct 2017). "Efficient and power smoothing drive-train concept for pumping kite generators using hydraulics". Presentation at Airborne Wind Energy Conference, Freiburg, DE.
- D. Todd*, W. Mérida. (Aug 2015) "Synthesis and performance of anisotropic porous transport layers". Presentation at International Conference on Electrochemical Energy Science and Technology, Vancouver, BC.
- D. Todd*, M. Schwager, L. Damron, S.R. Dhanushkodi, W. Mérida. (Jun 2015) "Sustainable transportation: current developments for the PEM fuel cell at UBC". Poster presentation at the 7th International Conference on Engineering Education for Sustainable Development, Vancouver, BC.
- D. Todd*, M. Schwager, S.R. Dhanushkodi, W. Mérida. (May 2015) "Porous transport layer characterization and efforts in engineered structures". Poster presentation at Catalysis Research for Polymer Electrolyte Fuel Cells Network, Burnaby, BC.
- D. Todd*, S.R. Dhanushkodi, W. Mérida. (May 2015) "Progress in PEM fuel cell diagnostics and characterization". Presentation at Catalysis Research for Polymer Electrolyte Fuel Cells Network, Burnaby, BC.
- D. Todd*, M. Schwager, S.R. Dhanushkodi, W. Mérida. (Mar 2015) "Recent development for the PEM fuel cell at UBC". Poster presentation at the 1st UBC Sustainability Research Symposium, Vancouver, BC.
- L. Damron*, M. Schwager, S. Flick, D. Todd, S.R. Dhanushkodi, W. Mérida. (Oct 2014) "The recent development of diagnostic tools for the PEM Fuel cell catalyst layer at UBC". Poster presentation at International Symposium on Electrocatalysis, Whistler, BC.
- D. Todd*, S. Flick, W. Mérida. (Jun 2014) "UBC activities within the CARPE-GECKO collaboration". Presentation at Catalysis Research for Polymer Electrolyte Fuel Cells Network, Burnaby, BC.

Devin Todd – List of Contributions

- M. Schwager*, D. Todd, S.R. Dhanushkodi, W. Mérida. (Jun 2014) “Spatially resolved PEMFC diagnostics via segmented cell featuring independent power electronics applied to water and catalyst management”. Presentation at the 97th Canadian Chemistry Conference and Exhibition, Vancouver, BC.
- S.R. Dhanushkodi*, M. Schwager, D. Todd, W. Mérida. (Jun 2014) “Use of segmented cells in durability testing: experimental studies to measure the spatial distribution of Pt surface area and performance loss in PEM fuel cells”. Presentation at the 97th Canadian Chemistry Conference and Exhibition, Vancouver, BC.
- S. Bennett*, D. Todd, W. Mérida. (Mar 2014) “Analysis of the effect of plastic deformation on the through plane conductivity of porous transport layers in proton exchange membrane fuel cells”. Presentation at UBC Multidisciplinary Undergraduate Research Conference, Vancouver, BC.
- O.E. Herrera, D. Todd*, S. Flick, W. Mérida. (May 2011) “Heat management in anode and cathode of a PEMFC”. Presentation at Hydrogen + Fuel Cells 2011: International Conference and Exhibition, Vancouver, BC.