

Patricia A. Beddows

Department of Earth & Planetary Sciences,
Environmental Science Program

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PROFESSIONAL INTERESTS

- Karst, and caves - hydrogeology, geomorphology, geochemistry, and sedimentology
- Paleoenvironmental records of sea level, climate change, and landscape evolution from sediments, speleothems, and fluid inclusions in speleothems
- Applied research includes water resources, contaminant transport, and geo-archaeology
- Leadership in earth and environmental science education and program development
- Problem-based learning (PBL) and experiential education beyond the classroom
- Open-source instrument hardware and software development for underwater and remote research

EDUCATION

Ph.D. School of Geographical Sciences, University of Bristol, UK Groundwater Hydrology of a Coastal Conduit Carbonate Aquifer: Caribbean Coast of the Yucatán Peninsula, México. 303 p.	1999 – 2004
M.Sc. Geography & Geology, McMaster University, Canada	1996 – 1999
B.A. Geography & Geology, McMaster University, Canada	1991 – 1995

EMPLOYMENT & APPOINTMENTS

Northwestern University, IL, USA

Director, Environmental Science Program	Fall 2019 – present
Assistant Chair, Earth & Planetary Sciences	2008 – present
Associate Professor of Instruction, Earth & Planetary Sciences	Spring 2019 – present
Assistant Professor of Instruction, Earth & Planetary Sciences	2014 – 2019
Lecturer, Earth & Planetary Sciences	2008 – 2014

McMaster University, ON, Canada

Post-Doctoral Research Fellow, School of Geography & Earth Sciences Project: Holocene Paleotemperature Records from Stable Isotopic Analysis of Speleothems and their Fluid Inclusions. Funded by the Canadian Foundation for Climate & Atmospheric Science (CFCAS).	2004 – 2008
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Custom Course Ware (CCW), McMaster University Bookstore (full & part time)

Full time	1993 – 1999
June 1995 – September 1996, and February 1997 - Sept. 1999	
CCW awarded 1 st place at the <i>Canadian Productivity Awards 1994</i> – Institutional Division. Integral in the development of this printing-on-demand business (established 1992) for "course packs". Established and refined business practices to secure copyright contracts, scanning, compilation, meta-data management, printing, and sales of materials. Worked as a team-member and trained numerous seasonal staff in a high-stress environment to consistently meet deadlines and outperform production goals.	

AWARDS, HONORS, AND FELLOWSHIPS

- Women Divers Hall of Fame** 2021
International professional honor society recognizing women divers who have made outstanding contributions to the exploration, understanding, safety and enjoyment of our underwater world and support the underwater world.
- ASG – Associated Student Government – Faculty Honor Roll** 2018
Recognition for work with EARTH 360: Field Methods and Instrumentation
- SAF Field Discovery Awards. Research team member.** 2017
Proyecto Arqueológico Subacuático Hoyo Negro, Tulum, Quintana Roo (Underwater Archaeological Project Hoyo Negro, Tulum). Archaeological excavations and surveys that have yielded major discoveries significantly furthering or even altering our knowledge of the human past, locally and/or globally.
- WCAS Weinberg College Arts and Sciences Alumni Teaching Award** 2015
Recognized for excellence as an undergraduate teacher. \$5000 award.
- 2015 Hackaday Prize Quarter-Finalist: Build Something that Matters** 2015
Joint with Edward Mallon. Technology development challenge. Quarter finalist for open-source long-lived datalogger hardware+software. The Cave Pearl Project. <https://hackaday.io/project/6961-the-cave-pearl-project>

PRE-DOCTORAL AWARDS, HONORS, AND FELLOWSHIPS

Overseas Research Student Award (3 years), from "Universities UK"	£58 200	1999 – 2002
University Research Scholarship (3 years), University of Bristol	£81 000	1999 – 2002
Special Opportunity Grant, Federal Government of Canada. (3 years)	\$ 9 000	1999 – 2002
Graduate Student Scholarship, McMaster University	\$22 000	1996 – 1998

RESEARCH FUNDING & SUPPORT

- 2015 – 2020
\$28,046
Sub-Award
Beddows P.A., Glover J.B. (PI with +\$232k), with Rissolo D., Smith D.M., Goodman B.
National Science Foundation – Division of Behavioral and Cognitive Science
Collaborative Research: Investigation into Long Term Human Coastal Adaptation
The Costa Escondida Project: An Interdisciplinary Investigation of Two Ancient Maya Ports and Their Surrounding Coastline
- 2019
\$1,000
Rosales-Lagarde, L. (PI), **Beddows, P.A.**
CUAHSI - Consortium of Universities for the Advancement of Hydrologic Science, sponsored by National Science Foundation. Instrumentation Discovery Travel Grant. Pedagogical exchange of problem-based instrumentation course to Nevada State College, including peer-mentoring of Rosales-Lagarde in construction of Cave Pearl data loggers.
- 2018
\$28,436
van Hengstum, P.(PI), Donnelly J.P., Steadman D.W., Albury N.A., **Beddows P.A.**, Feakins S.
National Geographic Society
15,000 years of disaster, drought, and deluges on a Caribbean Island: Implications for island biogeography, future climate change, and human migration in the tropical Americas
- 2014 – 2015
\$14,760
Mallon E.K. (PI), **Beddows P.A.**
National Geographic Society / Waitt Grants Program #W331-14
The Cave Pearl – A DIY Submersible Data Logger for Research in Flooded Caves
- 2013 – 2015
\$28,399
Beddows P.A.
Booster Grant. **Initiative for Sustainability and Energy at Northwestern (ISEN)**
Discharge of Sequestered P and Fe with Impact on Coastal Carbonate Factories

2011 \$79,738	Glover J.B., Rissolo D., Beddows P.A. , Smith D.M., Goodman B. National Oceanic and Atmospheric Administration (NOAA) - Office of Ocean Exploration and Research The Costa Escondida Project: Exploring the Hidden World of the Maritime Maya	
2010 \$13 800	Beddows P.A. Equipment Grant. Initiative for Sustainability & Energy at Northwestern (ISEN) CR100 Climate Station	
2009 – 2011 \$22 000	Lucero L. (PI), Beddows P.A. National Geographic Society - Research and Exploration Grant Diving the Sacred Pool at Cara Blanca, Belize.	
2001 £15 000	Smart P.L. (PI), Whitaker F.F., Beddows P.A. , Smith S.L. Royal Geographical Society London Ralph Brown Expedition Award	
2001 £10 000	Smart P.L. (PI), Whitaker F.F., Beddows P.A. , Smith S.L. Royal Geographical Society London Gilchrist Expedition Award	
1999 – 2002	Overseas Research Student Award (3 years), from "Universities UK"	£58 200
1999 – 2002	University Research Scholarship (3 years), University of Bristol	£81 000
1999 – 2002	Special Opportunity Grant, Federal Government of Canada. 3 awards	\$ 9 000
2002	British Geomorphological Research Group, Student Opportunity Grant	£ 200
2000 – 2002	University of Bristol Geographical Contingency Fund (2 awards)	£ 1 048
2000-2002	Alumni Foundation (2 awards)	£ 750
2001	Royal Society UK, Dudley Stamp Memorial Trust Award	£ 300
2000	Ghar Parau Award, Science Research Fund, British Cave Research Ass.	£ 900
1996 – 1998	Graduate Student Scholarship, McMaster University	\$22 000
1997	Graduate Studies Travel Bursary, McMaster University	\$ 500

PUBLICATIONS – Peer Reviewed Articles & Edited Chapters

* Student contributions.

WOS Indexed publications = 20 (underlined numbers). +3 in 2023

H-Index = 12 Web of Science, 18 Google Scholar.

Average citations per item = 40

APPROACHING SUBMISSION - 2023

37. **Beddows, P.A.**, Metcalfe, C., Merediz Alonso, G., López Tamayo, A., Lases-Hernandez, F.M. Tracking wastewater contamination in the “Maya Riviera” Region of the Yucatán Peninsula, México. *Environmental Pollution*.
38. *Monroy-Ríos, E., **Beddows, P.A.** (In revision) Hydrogeothermal convective circulation model for the formation of the Chicxulub Ring of Cenotes in the Yucatan Peninsula, Mexico. *Geochemistry, Geophysics, Geosystems*.
39. Little, S.N., van Hengstum, P.J., Donnelly, J.P., Sullivan, R.M., Winkler, T.S., **Beddows, P.A.**, Tamalavage, A.E., Fall, P.A., Albury, N.A. Dry season rainfall on the Little Bahama Bank in the Common Era.

PUBLISHED – IN REVIEW

36. Selensky, M.J., **Beddows, P.A.**, DeFranco, K., Jacobson, A.D., Osburn, M.R. (In review, March 2023) Microbial biogeography of the eastern Yucatán carbonate aquifer. *Applied and Environmental Microbiology*.
35. Bernal, J.P., Revolorio, F., Cu-Xi, M., Lases-Hernández, F., Piacsek, P., Lachniet, M. **Beddows, P.A.**, Lucia, G., López-Aguilar, K., Capella-Vizcaíno, S., López-Martínez, R. and O. Vásquez (2023) Variability of trace-elements and $\delta^{18}\text{O}$ in drip water from Gruta Rey Marcos, Guatemala: Seasonal and environmental effects and its implications for paleoclimate reconstructions. *Frontiers in Earth Sciences*. 11:1112957. <https://doi.org/10.3389/feart.2023.1112957>
34. Glover, J.B, Rissolo, D., **Beddows, P.A.**, Jaijel, R., Smith, D., Goodman-Tchernov, B. (2022) The Proyecto Costa Escondida: Historical ecology and the study of past coastal landscapes in the Maya Area. *Journal of Island and Coastal Archaeology*. DOI10.1080/15564894.2022.2061652
33. Little, S.N., van Hengstum, P.J., **Beddows, P.A.**, Donnelly, J.P., Winkler, T.S., Albury, N.A. (2021) Unique habitat for benthic foraminifera in subtidal blue holes on carbonate platforms. *Frontiers in Ecology and Evolution* – Special Issue "Living on the Edge: Biodiversity, Adaptation, and Evolution in Extreme Groundwater Habitats". 9: 794728. DOI: 10.3389/fevo.2021.794728
32. **Beddows, P.A.**, Mallon, E.K. (2018) Cave Pearl Data Logger – A flexible Arduino based logging platform for long-term monitoring in harsh environments. *Sensors*. 18, 530:1-26. DOI: 10.3390/s18020530. 9000+ pdf downloads and top 10% of publications in Altmetrics (Aug 2020).
31. *Johnson, D.B., **Beddows, P.A.**, Flynn, T.M., Osburn, M.R. (2018) Microbial diversity and biomarker analysis of modern freshwater microbialites from Laguna Bacalar, Mexico. *Geobiology*, 16(3):319-337. DOI 10.1111/gbi.12283.
30. Jaijel, R., Glover, J.B., Rissolo, D., **Beddows, P.A.**, Smith, D., Ben-Avraham, Z., Goodman-Tchernov, B. (2018) Coastal reconstruction of Vista Alegre, an ancient maritime Maya settlement. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 487:25-36. DOI: 10.1016/j.palaeo.2018.02.003
29. Jaijel, R., Kanari, M., Glover, J.B., Rissolo, D., **Beddows, P.A.**, Ben-Avraham, Z., Goodman Tchernov, B.N. (2018) Shallow geophysical exploration at the ancient maritime Maya site Vista Alegre, Yucatan Mexico. *Journal of Archaeological Science: Reports*. 19:52-63. DOI: 10.1016/j.jasrep.2018.02.018
28. Chatters, J.C., Rissolo, D., Arroyo Cabrales, J., Stafford, T.W., Kemp, B.M., Alvarez, A., Nava Blank, A., **Beddows, P.A.**, Reinhardt, E., Kovacs, S., Collins, S., Morell Hart, S. Chavez Arce, R., Bird, S. and Luna Erreguerena, L. (2017) Hoyo Negro: Tapping the paleoanthropological and paleoecological potential of a deeply submerged underground chamber on the Yucatan Peninsula, Mexico (Ch.6) in Campbell, P.B. (ed) *The Archeology of Underwater Caves*. Highfield Press, p. 119-129.
27. **Beddows, P.A.**, Glover, J., Rissolo, D., *Carter, A., Goodman, B., Jaijel, R., Smith D. (2016) Proyecto Costa Escondida: Recent interdisciplinary research in search of freshwater along the North Coast of Quintana Roo, Mexico. *Water - Wiley Interdisciplinary Reviews*. 3(5):749-761. DOI: 10.1002/wat2.1161
26. **Beddows, P.A.**, Mandic, M., Ford, D.C., Schwarcz, H.P. (2016) Oxygen and hydrogen isotopic variations between adjacent drips in three caves at increasing elevation in a temperate coastal rainforest, Vancouver Island, Canada. *Geochimica et Cosmochimica Acta*. 172:370-386. DOI: 10.1016/j.gca.2015.08.017
25. Chatters, J.D. Kennett, D.J., Asmerom, Y., Kemp, B.M., Polyak, V., Nava Blank, A., **Beddows, P.A.**, Reinhardt, E., Arroyo-Cabrales, J., Bolnick, D.A., Malhi, R.S., Culleton, B., Luna Erreguerena, P., Rissolo, D., Morell-Hart, S., Stafford, T.W. (2014) Late Pleistocene human skeleton and mtDNA from Mexico links Paleoamericans and modern Native Americans. *Science*. 344(6185):750-754. DOI: 10.1126/science.1252619

24. *Torres-Talamante, O., Alcocer, J., **Beddows, P.A.**, Escobar-Briones, E., Lugo, A. (2011) Key role of the chemolimnion in meromictic cenotes of the Yucatan Peninsula, Mexico. *Hydrobiologia*. 677(1):107-127. DOI: 10.1007/s10750-011-0746-9
23. Metcalfe, C., **Beddows, P.A.**, Gold Bouchot, G., Metcalfe, T., Li, H., Van Lavieren, H. (2011) Contaminants in the coastal karst aquifer systems along the Caribbean coast of the Yucatan Peninsula, Mexico. *Environmental Pollution*. 159(4):991-997. DOI: 10.1016/j.envpol.2010. 11.031.
22. **Beddows, P.A.** (2011) Hydrogeochemistry and geological context of the Pools of Cara Blanca, Belize, as a foundation for Holocene paleoenvironmental reconstruction; in Lucero, L. (ed) *Valley of Peace Archeological Report 2010*. 38 pp.
21. *van Hengstum, P.J., Reinhardt, E.G., **Beddows, P.A.**, Gabriel, J. (2010) Linkages between Holocene paleoclimate and paleohydrogeology preserved in a Yucatan underwater cave. *Quaternary Science Reviews* 29(19-20):2788-2798. DOI:10.1016/j.quascirev.2010.06.034
20. *van Hengstum, P.J., Reinhardt, E.G., **Beddows, P.A.**, Schwarcz, H.P., Gabriel, J.J. (2009) Foraminifera and testate amoebae (thecamoebians) in an anchialine cave: Surface distributions from Aktun Ha (Carwash) cave system, Mexico. *Limnology and Oceanography*. 54:391-396. DOI: 10.4319/lo.2009.54.1.0391
19. *Gabriel, J.J., Reinhardt, E.G., Peros, M.C., Davidson, D.E., van Hengstum, P.J., **Beddows, P.A.** (2009) Palaeoenvironmental evolution of Cenote Aktun Ha (Carwash) on the Yucatan Peninsula, Mexico and its response to Holocene sea level rise. *Journal of Paleolimnology*. 42(2):199-213. DOI: 10.1007/s10933-00809271-x
18. *van Hengstum, P.J., Reinhardt, E.G., **Beddows, P.A.**, Huang, R.J., Gabriel, J.J. (2008) Thecamoebians (testate amoebae) and foraminifera from three anchialine cenotes in Mexico: Low salinity (1.5-4.5 psu) faunal transitions. *Journal of Foraminiferal Research*. 38:305-317. DOI: 10.2113/gsjfr.38.4.305
17. *Zhang, R., Schwarcz, H.P., Ford, D.C., Serefiddin-Schroeder, F., **Beddows, P.A.** (2008) Absolute palaeotemperature record from 10 to 6 ka inferred from fluid inclusion D/H ratios of a stalagmite from Vancouver Island. British Columbia. *Geochimica Cosmochimica et Acta*. 72(4):1014-1026. DOI:10.1016/j.gca.2007.12.002
16. Ufnar, D., Gröcke, D.R., **Beddows, P.A.** (2008) Paleo-evaporation rates from positive linear covariant trends in pedogenic calcite. *Chemical Geology*. 256(1-2):46-51, 10.1016/j.chemgeo. 2008.07.022.
15. **Beddows, P.A.**, Brunton, F.R., Buck, M.J., Cowell, D.W. and Parker, S. (2008) Root Cave Project, southern Ontario; in Summary of Field Work and Other Activities 2008, Ontario Geological Survey, Open File Report 6226, p.35-1 to 35-9.
14. **Beddows, P.A.**, Schwarcz, H.P., *Zhang, R., Ford, D.C. (2008) Cave drip monitoring as a foundation for better paleo-climate reconstruction. In W.R. Elliott (ed.), *Proceedings of the 2007 National Cave and Karst Management Symposium*, St. Louis, USA. 204-211.
13. **Beddows, P.A.**, Hendrickson, M.R., Webster, K.H., Kras, S.M. (2008) Mapping flooded caves from above: Surface karst inventory of the Yucatan Peninsula. In W.R. Elliott (ed.), *Proceedings of the 2007 National Cave and Karst Management Symposium*, St. Louis, USA. 193-197.
12. **Beddows, P.A.**, Hendrickson, M.R. (2008) When the survey is not enough: Using temperature, salinity, and in-conduit dye tracing to reveal active flow paths. In W.R. Elliott (ed.), *Proceedings of the 2007 National Cave and Karst Management Symposium*, St. Louis, USA. 198-203.
11. **Beddows, P.A.**, Smart, P.L., Whitaker, F.F., Smith, S.L. (2007) Decoupled fresh-saline groundwater circulation of a coastal carbonate aquifer: Spatial patterns of temperature and specific electrical conductivity. *Journal of Hydrology*. 346(1-2): 18-32, DOI:10.1016/j.jhydrol. 2007.08.013.

10. **Beddows, P.A.** Blanchon, P., Escobar, E., Torres-Talamante, O. (2007) Los cenotes de la península de Yucatán. *Arqueología Mexicana*, 16(83):32-35 (In Spanish)
9. Smart, P.L., **Beddows, P.A.**, Doerr, S., Smith, S.L., Whitaker, F.F. (2006) Cave development on the Caribbean coast of the Yucatan Peninsula, Quintana Roo, Mexico. *Geological Society of America Special Paper 404: Perspectives on Karst Geomorphology, Hydrology, & Geochemistry*, 105-128, DOI:10.1130/2006. 2404(10).
8. **Beddows, P.A.** (2003) Yucatán Phreas, Mexico. In Gunn, J. (ed) *Encyclopaedia of Cave and Karst Science*, Routledge Taylor & Francis Group, New York, USA. 794-796.
7. **Beddows, P.A.** (2003) *Cave Hydrology of the Caribbean Yucatan Coast*, Bulletin 11, Association of Mexican Cave Studies, Houston, USA. 96 pp.
6. **Beddows, P.A.**, Smart, P.L., Whitaker, F.F. & Smith, S.L. (2002) Density stratified groundwater circulation on the Caribbean Coast of Yucatan peninsula, Mexico. In Martin, J.B., Wicks, C.M., & Sasowsky, I.D. (eds) *Karst Waters Institute Special Publication 7: Hydrogeology and Biology of Post-Paleozoic Carbonate Aquifers*, 129-134.
5. Smart, P.L., **Beddows, P.A.**, Doerr, S., Smith, L.S. & Whitaker, F. (2002) Hydrochemical processes and cave development on the Caribbean Coast, Yucatan Peninsula, Mexico. In Martin, J.B., Wicks, C.M., & Sasowsky, I.D. (eds) *Karst Waters Institute Special Publication 7: Hydrogeology and Biology of Post-Paleozoic Carbonate Aquifers*, 79-83.
4. Smith, S.L., Whitaker, F.F., Parkes, R.J., Smart, P.L., **Beddows, P.A.** & Bottrell, S.H. (2002) Geochemistry and geomicrobiology of saline groundwaters: Yucatán Peninsula, Mexico. In Martin, J.B., Wicks, C.M., & Sasowsky, I.D. (eds) *Karst Waters Institute Special Publication 7: Hydrogeology and Biology of Post-Paleozoic Carbonate Aquifers*, 135-137.
3. **Beddows, P.A.** (2002) Where does the Sewage Go? Karst groundwater system of the Municipalidad de Solidaridad, Quintana Roo, Mexico. *Association for Mexican Cave Studies Activities*, 47-52.
2. Worthington, S.R.H., Ford, D.C. & **Beddows, P.A.** (2001) Characteristics of porosity and permeability enhancement in unconfined carbonate aquifers due to the development of dissolutional channel systems. *Technical Documents in Hydrology - Present state and future trends of karst studies*. IHP-V, UNESCO, Paris 1(49): 13-29.
1. Worthington, S., Ford, D.C. & **Beddows, P.A.** (2000) Porosity and permeability enhancement in unconfined carbonate aquifers as a result of solution. In Klimchouk, A. Ford, D., Palmer, A. & Dreybrodt, W.(eds) *Speleogenesis: Evolution of Karst Aquifers*, Cave Books, St Louis (ISBN 978-1-57958-399-6), 463-471.

WORK IN PROGRESS

40. *Monroy-Ríos, E., **Beddows, P.A.** Glover, J., Rissolo, D., Hendy, I., Schwartz, B., Jensen, A., Scotese, C. Tectonic displacement of the Yucatan Platform. Target journal – *Geology*.
41. *Jenson, A.A., Schwartz, B.F., Gao, Y., Li, Y., **Beddows, P.A.** (Needing final field measurements post COVID – may not be yet possible in 2022) Evidence of uplift in the Yucatan Peninsula using water table folia as sea level proxies: Quintana Roo, Mexico. *Target journal - Nature Geoscience*
42. Lasas-Hernandez, F.M., Bernal, J.P., **Beddows, P.A.**. Prior calcite precipitation in the karst Río Secreto Cave, in the northeastern Yucatán Peninsula, México. *Target Journal - Chemical Geology*.

CONFERENCE CONTRIBUTIONS

* Student contributions

- Bernal J.P., Piaseck P., Cu Xi M., Revolorio F., Lachniet M.S., **Beddows P.A.**, Lucia G., Lopez Martínez R., Vázquez O. (2022) Understanding the variability of trace-elements and $\delta^{18}\text{O}$ in drip water from Gruta Rey Marcos, Guatemala. AGU Fall Meeting 2022, Chicago.
- Bernal J.P., Cu Xi M., Lachniet M.S., Revolorio F., Piaseck P., **Beddows P.A.**, Correa-Metrio A., Corona Martinez L., Lucia G., Vázquez O. (2022) A multi-proxy paleohydrological reconstruction for Northern Central America and southern Mexico in orbital and sub-orbital timescales; speleothem $\delta^{18}\text{O}$ and trace element records from Gruta Rey Marcos, Guatemala. AGU Fall Meeting 2022, Chicago.
- Chatter, J.C., **Beddows, P.A.**, Reinhardt, E., Bernal, J.P. (2022) Radiometric dating in the submerged caves of the Yucatan Peninsula. Society of American Archaeology. March 30 – April 2, Chicago, Ill.
- Lases Hernández, F., Medina Elizalde, M., Bernal Uruchurtu, J.P., **Beddows, P.A.**, Burns, S., Serrato Marks, G., Travis-Taylor, L., McGee, D., Frappier, A.B. (2021) Retos y perspectivas para la reconstrucción paleoclimática a partir de estalagmitas en la Península de Yucatán. XV Congreso Nacional Mexicano de Espeleología: El Caribe comienza en las cuevas. Playa del Carmen. 29 October – 2 November 2021.
- Beddows, P.A.**, Rosales Lagarde, L., Davis, B., Mallon, E.K. (2021) Jumping the institutional gulf: An Innovative course for primary data skills. Cross institutional coordinated panel discussion. *Northwestern University TEACHx*. Evanston, May 2021.
- Rissolo, D., Jaijel, R., Goodman-Tchernov, B., **Beddows, P.A.**, Smith, D., Glover, J.B. (2020) Paleocoastal reconstruction of an ancient Maya trading port, Quintana Roo, Mexico. *AGU Ocean Sciences Meeting*. San Diego. February 17, 2020.
- Beddows, P.A.**, Mallon, E.K. (2019) Global broader impacts: Reach of a web-based open-source project. *Northwestern University TEACHx*. Evanston, May 2019.
- Lases-Hernández, F., Bernal, J.P., Medina-Elizalde, M., **Beddows, P.A.**, Burns, S. (2019) Long-term monitoring of drip water trace elements and Cl variability of Río Secreto Cave in the Yucatan Peninsula, Mexico. *Goldschmidt*, August 2019. Barcelona, Spain.
- van Hengstum, P.J., Albury, N.A., **Beddows, P.A.**, D'Entremont, N., Donnelly, J.P., Little, S.N., McKeon, K., Mendez, J., Shipley, O., Sullivan, R.M., Tamalavage, A.E., Wallace, E.J., Winkler, T.S. (2019) A 50,000-year stratigraphic record from a Bahamian sinkhole and direct evidence for Saharan dust export to the tropical North Atlantic. *American Geophysical Union Annual Meeting*. Dec 2019. Abstract # 588641
- Beddows, P.A.** (2018) Toward lifelong science: Problem-based learning using open-source hardware. Selected speaker. Interactive Presentation. *Northwestern University TeachX*. Chicago, May 2018
- Lases-Hernandez, M.F., Medina-Elizalde, M.A., Burns S.J., DeCesare M., Bernal J.P., **Beddows, P.A.** (2018) Transmission of hydrogen and oxygen isotopic variability from precipitation to dripwater at Rio Secreto Cave in the Yucatan Peninsula: Implications for speleothem rainfall reconstruction. AGU Annual Meeting. Washington, DC. December 2018. PP12B-06. ID#: 346158
- *Monroy-Ríos, E., **Beddows, P.A.** (2018). Exploring the tectonic stability of the Yucatán Peninsula. Virtual Poster Showcase, American Geophysical Union Annual Meeting, DC. Dec 2018.
- *Monroy-Ríos, E., **Beddows, P.A.** (2018) On the tectonic stability of the Yucatan Block. Geological Society of America Abstracts with Programs. 50(6): Paper 207-13, ISSN 0016-7592. doi: 10.1130/abs/2018AM-320245
- *Lammers, A.M., **Beddows, P.A.** (2018) Beyond spreadsheets – R Interface for initial analysis and visualization of “medium data” from environmental monitoring networks. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, ISSN 0016-7592 doi: 10.1130/abs/2018AM-323107

- Beddows, P.A.**, Mallon, E.K. (2018) Cave Pearl Data Logger Project – Building an online platform for broader impact and educational outreach. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, ISSN 0016-7592. doi: 10.1130/abs/2018AM-320230
- Beddows, P.A.**, Rissolo D., *Monroy-Ríos, E., Meyer, D., Goodman, B. (2018) Coastal hydrogeological context of potable water sources of the Vista Alegre Maya Port Site, Yucatan Peninsula, Mexico. Society of American Archeology 83rd Annual Meeting, Washington, DC
- Meyer, D., Lo, E., Mercure, D., **Beddows, P.**, Rissolo, D. (2018) Thermal identification of groundwater discharges within saline lagoons surrounding Vista Alegre, Quintana Roo, Mexico. Society of American Archeology 83rd Annual Meeting, Washington, DC
- Rissolo, D., Chatters, J.C., Nava Blank A., Reinhardt, E., **Beddows, P.** Kovacs, S., Collins, S., Luna Erreguerena, P. (2018) Hoyo Negro: The formation and transformation of a submerged Late Pleistocene cave site in Quintana Roo, Mexico. In Drowned Landscapes to Understanding Past Peoples. Society for Historical Archeology. Albuquerque, NM. 2018 (tDAR id: 441863)
- Jaijel, R., Goodman, B., Glover, J., Rissolo, D., **Beddows, P.**, *Carter, A., Smith, D., Rissolo, D., Ben Avraham, Z. (2017) Ancient shoreline reconstruction at a Maritime Maya Port in Yucatan, Mexico. EGU General Assembly Conference Abstracts. 19:13533
- Jaijel, R., Goodman, B., Glover, J., **Beddows, P.**, *Carter, A., Smith, D., Rissolo, D., Ben Avraham, Z. (2016) Environmental and morphological changes around the Maritime Maya site Vista Alegre. EGU General Assembly 2016. Geophysical Research Abstracts. Vol. 18, EGU2016-6510-1, 2016
- *Cai, K., **Beddows, P.**, Toomey, R., Trimboli, S.R., Olson, R.A. (2015) Bacteriological assessment of vadose zone connectivity at Mammoth Cave National Park, USA, following sewer line break summer 2014. GSA – Geological Society of America North-Central Section - 49th Annual Meeting (19-20 May 2015) 47(5):83.
- *Monroy-Río, E., **Beddows, P.A.** (2015) Hydrogeothermal convective circulation model for the formation of the Chicxulub Ring of Cenotes in the Yucatan Peninsula, Mexico. American Geophysical Union Fall Meeting Poster: EP53A-0979
- Mallon, E.K., **Beddows, P.A.** (2015) Cave Pearl Project – Low cost open-source hardware for environmental monitoring networks. GSA Baltimore Annual Meeting. Abstracts and Programs 47(7):559. Paper 218-8.
- Beddows, P.A.**, Mandic, M., Ford, D.C., Schwarcz, H.P. (2015) Intra- and Inter-cave drip δD and $\delta 18O$ isotopic lags and damping from monitoring in three caves along an altitudinal gradient, Vancouver Island, British Columbia, Canada. GSA Baltimore Annual Meeting. Abstracts and Programs 47(7): 263. Paper 92-6.
- Beddows, P.A.**, Mallon E.K. (2015) Regional aquifer monitoring network in the coastal karst of the Yucatan Peninsula, using Cave Pearl project open-source hardware, with comparison to commercial instrumental records. GSA Baltimore Annual Meeting. Abstracts & Programs 47(7):263. Paper 92-9.
invited
- Jaijel, R., Goodman, B. N., **Beddows, P.**, *Carter, A., Smith, D., Rissolo, D., Glover, J. B., Ben Avraham, Z. (2015) Reconstructing the shoreline and climate of the ancient Maya port Vista Alegre using marine geoaerchaeological methods. Aquatic Sciences Meeting, Grenada, Spain. Session 109.
- Chatters, J.C., Luna-Erreguerena, P. Rissolo, D., **Beddows, P.**, Morell-Hart, S. (2015) An Overview of the Hoyo Negro project and its findings. 80th Annual Meeting of the Society for American Archeology. San Francisco, CA (tDAR id: 396536)
- Mallon, E.K., **Beddows, P.A.** (2014) A Low-cost submersible data logger system for environmental networks. GSA Annual Meeting in Vancouver, British Columbia. Geological Society of America Abstracts with Programs. 46(6): 534

- *McMonigal, K.T., **Beddows, P.A.** (2014) Calcite rafts – Rapid deposition of transgressive infill cave sequences as a new paleo-sea level proxy. GSA Annual Meeting in Vancouver, British Columbia. Geological Society of America Abstracts with Programs. 46(6): 127
- Glover, J.B., Rissolo, D., **Beddows, P.**, Goodman, B., Smith, D. (2014) El Proyecto Costa Escondida: Una Investigación Paleoambiental y Arqueológica del Puerto Maya Vista Alegre Quintana Roo, México in XXVII Simposio de Investigaciones Arqueológicas en Guatemala. Museo Nacional de Arqueología y Etnología, Guatemala.
- Jaijel, R., Goodman, B., **Beddows, P.A.**, *Carter, A., Smith, D., Rissolo, D., Glover, J., Ben Avraham, Z. (2014) Reconstructing the shoreline and climate of the ancient Maya port Vista Alegre using marine geoaerchaeological methods. Society for Historical Archeology Program and Book of Abstracts. Quebec City, CDA. p. 52.
- Nava Blank, A., Rissolo, D., Chatters, J.C., Luna Erreguerena, P., Bird, S., **Beddows, P.A.**, Arroyo Cabrales, J., Morell-Hart, S. (2014) The Hoyo Negro Project: Recent investigations of a submerged Late Pleistocene cave site in Quintana Roo, Mexico. Society for Historical Archeology Program and Book of Abstracts. Quebec City, CDA. p. 52.
- Rissolo, D., Jaijel, R., Glover, J.B., Goodman, B., **Beddows, P.**, *Carter, A., Smith, D. (2013) Paleoenvironmental and paleoecological reconstruction of the ancient Maya port site of Vista Alegre, Quintana Roo, Mexico. AGU Fall Meeting, San Francisco, CA.
- Glover, J., Rissolo, D., **Beddows, P.A.**, Goodman, B., Smith, D. (2013) Proyecto Costa Escondida: Interdisciplinary research at the ancient Maya port site of Vista Alegre, Quintana Roo, Mexico. AGU Meeting of the Americas, Cancun, MX. H41A-05
- Beddows, P.A.** (2013) Exploring the hydrogeology and hydrogeochemistry of the Holbox Lagoon. Abstracts of the Society of American Anthropologist 77th Annual Meeting, Memphis, TN. 77:47.
- Goodman Tchernov, B., Jaijel, R., **Beddows, P.A.**, Rissolo, D., Glover, J. (2013) Coring for harbor sediments at Vista Alegre. Abstracts of the Society of American Anthropologist 77th Annual Meeting, Memphis, TN. 77:144.
- *Monroy-Ríos, E., **Beddows, P.A.** (2012) Submarine groundwater discharge of phosphorus and iron from carbonate coastlines under rising sea levels, Yucatan Peninsula, Mexico. GSA Abstracts and Programs 44(7): 158
- *Carter, A., **Beddows, P.A.** (2012) Holocene sea level and paleo-evaporation records from the maritime Maya port city of Vista Alegre, Yucatan Peninsula. GSA Charlotte Annual Meeting. Abstracts and Programs 44(7): 433.
- Beddows, P.A.**, Metcalfe, C.D., Bouchot Gold, G., Metcalfe, T.L., Li, H., van Lavieren, H. (2011) Tracing flow paths using contaminants in the coastal karst aquifer system along the Caribbean Coast of the Yucatan Peninsula, Mexico. GSA Minneapolis Annual Meeting (9-12 October, 2011). Abstracts with Programs 43(5): 286.
- Beddows, P.A.** (2010) Effective placed-based field learning spanning sub-disciplines and undergraduate-graduate levels: Northwestern University Field Excursion to the karst geology of the Yucatan Peninsula. GSA Denver Annual Meeting (31 October –3 November 2010). Abstracts with Programs 42(5): 443.
- Smart, P.L., **Beddows, P.A.**, Whitaker, F.F. and Smith S.L. (2010) Regional groundwater circulation of the Caribbean Yucatan coastal aquifer: Results from temperature, specific electrical conductance, dye tracing and flow meter observations. Geological Society of London Meeting on Island and Coastal Hydrology, London, December 2010.

- Reinhardt, E., *Gabriel, J., *Van Hengstum, P.J. and **Beddows, P.A.** (2010) Did groundwater stratification during drought provide potable groundwater in the Northern Yucatan Peninsula during the Maya Terminal and Post-Classic? GSA Denver Annual Meeting (31 October – 3 November 2010). No. 93-6
- Beddows, P.A.** (2009) Primary and secondary stratifications as a control on mass and energy fluxes within the Yucatan Peninsula anchialine aquifer system. *Proceedings of the Anchialine Ecosystems: Reflection and Prospects Symposium*. Mallorca, Spain.
- *Van Hengstum, P.J., Reinhardt, E.G., **Beddows, P.A.**, *Gabriel, J.J. (2009) Environmental reconstruction of a Mexican flooded cave system: Evidence for climate-forced changes to the local freshwater lens, *Eos Transactions AGU*, 90(22), Joint Assembly Supplement, Abstract PP74A-04
- *Torres-Talamante, O., Escobar-Briones, E., **Beddows, P.A.**, Yager, J. (2008) Performing multiprobe profiles and hydrographic description of the water column in an anchialine cave in Quintana Roo. In P. Brueggeman, N.W. Pollock (eds) *Proceedings of the American Academy of Underwater Sciences 27th Symposium*. San Diego, USA, archive.rubicon-foundation.org/8022. ISBN: 978-0-9800423-2-0
- *Zhang, R., Schwarcz, H.P., Ford, D.C., **Beddows, P.A.** (2008) A paleotemperature record obtained from fluid inclusion D/H studies of three coeval aragonite and calcite speleothems from Marengo Cave, Indiana, USA. *Climate Change - the Karst Record 5th International Conference*, Chongqing, China.
- Beddows, P.A.**, Ford, D.C., Schwarcz, H.P., *Zhang, R. (2008) Hydrochemical and isotopic variability of cave drip water along an elevation gradient and Holocene paleoenvironmental reconstruction, Vancouver Island, Canada. *European Geophysical Union General Meeting*, Vienna, Austria.
- Ufnar, D., Gröcke, D.R., **Beddows, P.A.** (2007) Stable isotopes in pedogenic calcite: Can the positive linear covariant trends be used to quantify paleo-evaporation rates? *American Geophysical Union Fall Meeting*, San Francisco, USA.
- Beddows, P.A.**, *Zhang, R., Schwarcz, H.P., Ford, D.C. (2007) Cave drip waters associated with speleothem formation: Intra and inter-site comparison. *Geological Society of America Abstracts*. Denver, USA.
- Ford, D.C., **Beddows, P.A.**, *Zhang, R., Schwarcz, H.P. (2007) Holocene environmental change on Vancouver Island: The karst record. *Geological Society of America Abstracts*. Denver, USA.
- *Zhang, R. Schwarcz, H.P., Ford, D.C., **Beddows, P.A.** (2007) Paleoclimate variations from 0 to 12.3 ka BP inferred from three coeval calcite and aragonite speleothems from Marengo Cave, Indiana, USA. *Geological Society of America Abstracts*. Denver, USA.
- Beddows, P.A.**, Schwarcz, H.P., *Zhang, R., Ford, D.C. (2006) Integrated study of cave drip hydrology and hydrochemistry, and the associated paleoclimate records from North America. *Karst Waters Institute Special Publication 10: Archives of Climate Change in Karst*, 91-93
- Beddows, P.A.**, *Zhang, R., Schwarcz, H.P., Ford, D.C. (2006) δD , $\delta^{18}O$, and hydrological variations in adjacent drips in three caves at increasing elevation: Vancouver Island, BC. *Geological Society of America Abstracts*. Philadelphia, USA.
- Beddows, P.A.**, Webster, K.H., Kras, S.M. (2006) Inventory development for surface karst features of the Caribbean coast of the Yucatan Peninsula. *Geological Society of America Abstracts*. Philadelphia, USA.
- *Torres-Talamante, O., Escobar-Briones, E., Álvarez, F. Alcocer, J., Mejía, L., **Beddows, P.**, Yager, J. (2006) Estudio de relaciones ecológicas y biogeoquímicas de *Speleonectes tulumensis* (Yager, 1987) en un sistema anquihalino. *V Congreso y Reunión Villalobos*. Mexico City, Mexico
- Beddows, P.A.** Smart, P.L., Whitaker, F.F., Smart, S.L. (2006) Regional groundwater circulation of the Caribbean Yucatan aquifer revealed using temperature and specific electrical conductance observations. *Limestone Hydrogeology Meeting of the Geological Society*. Bristol, U.K.

- Beddows, P.A.**, Smart, P.L., Smith, S.L., Whitaker, F.F. (2005) Potential for inland dispersal of injection well effluent in coastal carbonate aquifers: Evidence from Caribbean Yucatan coast. *Proceedings of the National Cave and Karst Management Symposium*. Albany, USA
- Beddows, P.A.**, *Zhang, R., Schwarcz, H.P., Ford, D.C., Chin, K. (2005) Instrumental challenges and unexpected research potential revealed by a North American cave drip monitoring network. *Proceedings of the National Cave & Karst Management Symposium*. Albany, USA
- Beddows, P.A.**, *Zhang, R., Schwarcz, H.P., Ford, D.C. (2005) Seasonality of cave drip hydrology and chemistry in relation to mid-latitude North American Holocene paleoclimate records from speleothems. *Geological Society of America Abstracts* 37(7):310. Salt Lake City, USA.
- *Zhang, R., Schwarcz, H.P., Ford, D.C., **Beddows, P.A.** (2005) SEM and petrographic studies of stalagmite caps and trapping of fluid inclusions. *Geological Society of America Abstracts*. 37(7):310. Salt Lake City, USA.
- Beddows, P.A.**, *Zhang, R., Ford, D.C., Schwarcz, H.P. (2005) Calibrated Holocene paleo-temperature record for North America from stable isotopic analyses of speleothems and their fluid inclusions. *Union International de Speleologie Congress Abstracts*. Athens, Greece.
- Beddows, P.A.**, Smart, P.L., Smith, S.L., Whitaker, F.F. (2005) Decoupled and depth stratified circulation in a coastal carbonate aquifer: Yucatan Peninsula, Mexico. *Union International de Speleologie Congress Abstracts*. Athens, Greece.
- Smith, S.L., Whitaker, F.F., Parkes, R.J., Smart, P.L. & **P.A. Beddows** (2005) Bacterially induced carbonate dissolution in a modern mixing zone: Yucatan Peninsula, Mexico. *International Symposia for Subsurface Microbiology & Environmental Biogeochemistry Abstract Volume*. Jackson Hole, USA.
- Beddows, P.A.**, Smart, P.L., Whitaker, F.F., Smith, S.L. (2004) Heliothermic heating of density stratified groundwater – An Alternative interpretation to geothermal circulation. *Geological Society of America Abstracts* 36(5):310. Denver, USA.
- Beddows, P.A.**, Smart, P.L., Whitaker, F.F. & Smith, S.L. (2004) Regional groundwater circulation of the Caribbean Yucatan aquifer revealed using temperature and specific electrical conductance observations. British Cave Research Association Science Symposium. Published in *Journal of Cave and Karst Science*. Manchester, UK.
- Beddows, P.A.**, Smart, P.L., Whitaker, F.F. & Smith, S.L. (2003) Decoupled density stratified groundwater circulation on the Caribbean Coast of the Yucatan peninsula, Mexico. British Cave Research Association Science Symposium. *Journal of Cave and Karst Science*, 29(2):91. Bristol, UK.
- Smith, S.L., Whitaker, F.F., Parkes, R.J., Smart, P.L., **Beddows, P.A.**, Bottrell, S.H. (2003) Active dolomitization by saline groundwaters in the Yucatán Peninsula, Mexico. British Cave Research Association Science Symposium. *Journal of Cave and Karst Science* 29(2):93. Bristol, UK.
- Worthington, S.R.H., Ford, D.C., **Beddows, P.A.** (2001) Porosity and permeability enhancement in unconfined carbonate aquifers as a result of dissolution. SPELEO Brazil 2001 - 13th International Congress of Speleology. Brasilia. Brazil.
- Beddows, P.A.**, Ford, D.C., & Worthington, S.R.H. (1998) Sustainable potable water supplies from conduit systems: Caribbean coast, Yucatan Peninsula, Mexico. *Geological Society of America Abstracts*. 30(7). Toronto, Canada.
- Beddows, P.A.**, & Ford, D.C. (1998) Spatial and temporal trends of groundwater velocity and water stage within the Nohoch Nah Chich System: Implications for contaminant dispersion (Yucatan Peninsula, México). *Geological Association of Canada & the Mineralogical Association of Canada Abstract Volume - Quebec 1998*, A13. Québec City, Canada.

Beddows, P.A., & Ford, D.C. (1998) Hydrological aspects of a tropical coastal karstic aquifer: North-eastern Yucatan Peninsula. *The Association of American Geographers 94th Annual Meeting, 1998 Abstract Volume*, p.19. Boston, USA.

INVITED SEMINARS / PROFESSIONAL TALKS

Pending in 2023.

Keynote – Comisión Nacional del Agua (México) Consejo de Cuenca de la Península de Yucatán

Grupo XEL HA

SCRIPPS – invited. Fall 2023. TBD

UNAM Instituto de Geociencias – invited

NU Alumnae Associate – Women in Science course series	Fall 2022
Consejo de Cuenca de la Península de Yucatán	March 2022
Centinelas del Agua – Dia Mundial del Agua	March 2022
Red de Planetarios de Quintana Roo (16,000+ views)	March 2022
Green House, Residence Hall, Northwestern University	February 2022
Northwestern Energy Technology Group (NETG)	February 2022
NU Alumnae Association – Health of Our Planet: Past, Present and Future course series.	Spring 2021
Willard Residential Hall, Northwestern University	September 2021
TeachX – Northwestern University selected presenter. Panel coordination.	May 2021
Nevada State College	September 2019
Grupo X-Caret (at Xel Ha)	July 2019
Chicago Scuba Meetup	June 2019
Northern Illinois University, Department of Geology and Environmental Geosciences	April 2019
TeachX – Northwestern University selected presenter	2018
Rio Secreto Nature Reserve	2017 & 2018
Geological Society of America – Invited speaker in Session - T120. Karst Processes & Speleogenesis: Advances in Monitoring, Modeling, & Measurements	2015
Centinelas del Agua, Playa del Carmen in Rio Secreto	2015
Northwestern Science Café - Skeletons in the Cave: Survival in a Changing World	2015
NU Knowledge at Noon	2015
Northwestern Faculty Alumni Association	2015
Comisión Nacional del Agua (CONAGUA)	2012
Northwestern University, Department of Earth and Planetary Sciences	2012
Florida International University, Civil and Environmental Engineering – WATERSCAPES Speaker	2010
University of Illinois at Chicago, Department of Earth and Environmental Sciences	2009
Northern Illinois University, Department of Geology and Environmental Geosciences	2009
Northwestern University, Department of Earth and Planetary Sciences	2008
Université de Montréal, Département de géographie	2008
Johns Hopkins University, Department of Earth and Planetary Sciences	2008
Nipissing University, Geography Department	2008
University of Toronto, Physical and Environmental Sciences	2008
University of Toronto, Department of Geology	2008

Kutztown University, Department of Geology	2008
Western Kentucky, Department of Geography and Geology	2008
University of Dayton, Department of Geology	2008
Universidad Nacional Autónoma de México. Instituto de Ciencias del Mar y Limnología (ICMyL) Puerto Morelos, México [in Spanish]	2007
University of Lethbridge, Geography Department	2007
Foro del Agua, Municipalidad de Solidaridad, Quintana Roo, México [in Spanish]	2006
McMaster University, School of Geography & Earth Sciences, Canada	2006
University of Victoria, Department of Geography, Canada	2006
University of Regina, Department of Geography, Canada	2006
University of Akron, Department of Geology, USA	2005
University of South Florida, Department of Environmental Science & Policy	2003
Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Departamento de Oceanografía Física, Ensenada, México [in Spanish]	2002

PEER-REVIEW & RELATED ACTIVITIES

Recommendation Letters

In support of applications for professional and academic opportunities

2020	49
2021	51
2022	62

National Science Foundation – Panel Reviewer

December 2020, September 2021

Northwestern Undergraduate Research Grants – URG

2011 – 2015

Reviewer of 100+ academic and summer applications annually, and additional identification of awards for ISEN funding. **ISEN Representative** – Of the funded URG projects, undertaking additional selection and recommending ISEN support

Grant / Fellowship Reviews – last 10 years

Women Divers Hall of Fame – Marine Conservation Scholarship
 PAPIIT – Programa de Apoyo a Proyectos de Investigación e Innovación Tecnológica (México)
 NSF - National Science Foundation
 NGS - National Geographic Society
 Waitt Foundation
 GWIS - Graduate Women in Science
 McArthur Foundation

Peer Review – Journal Articles – last 5 years

Geophysical Research Letters	Limnology and Oceanography
Hydrology and Earth System Science	Geochimica et Cosmochimica Acta
Journal of Hydrology	Hydrological Processes
Hydrogeology Journal	Journal of Paleolimnology
Hydrobiologia	Geosciences
Journal of Cave and Karst Studies	Ecohydrology
Paleogeography, Paleoclimatology, Paleoecology	

CONSULTANCIES IN THE PUBLIC & PRIVATE SECTORS

Scientific Advisor ongoing 20+ years

Municipalities of: Tulum, Solidaridad, and Bacalar, Quintana Roo, México

CNA - Comisión Nacional del Agua - Consejo de Cuencas

[National Water Commission of Mexico]

Non-government organizations: Amigos de Sian Ka'an (ASK), Centinelas de Agua, Centro Ecológico Akumal (CEA), Razonatura, Centro México de Derecho Ambiental (CEMDA), environmental lawyer Luis Leal, and others.

Frequent consultation at nearly monthly frequency on science and technical issues related to groundwater and coastal issues. Provision of technical/educational presentations in Spanish in QR. Participation in government planning meetings.

The last 5 years include advisement on transport of organic contamination (sewage effluent) in the drinking water and cave systems, site specific development issues, review of the environmental impact assessments, establishing a monitoring network for watershed quality, and water quantity and dynamics, and the planning of a Recharge Zone Hydrological Reserve.

Scientific Advisor: The Nature Conservancy International (TNC) 2009 – 2010

Active member of panel through evaluation phase.

Contributions to writing and final editing of Plan de Conservación Akumal Tulum, 2009. 57pp.

National Geographic contracted to Sea Studios of Monterrey 2007-2008

a. Dirty Secrets Released 2008. An episode of National Geographic's Strange Days on Planet Earth. On-camera scientist and scientific advisor.

b. Coral Connections Released 2008. Scientific advisor.

BBC Natural History Unit, Bristol, U.K. 2004 - 2005

Secrets of Mayan Underworld Released 2005. Scientific advisor. (Remunerated)

BBC Natural History Unit, Bristol, U.K. 2004 - 2006

Planet Earth: Caves Released 2006. Scientific advisor. (Remunerated)

PROFESSIONAL AFFILIATIONS

Active

American Geophysical Union AGU

Geological Society of America GSA

American Association for the Advancement of Science AAAS

National Speleological Association, including Cave Diving and Geology sections NSS-CDS

Canadian Association of Geographers CAG

Royal Geographical Society with Institute of British Geographers, Fellow RGS-IBG

Geological Association of Canada GAC

Previous

British Cave Research Association BCRA

Canadian Geomorphology Research Group CGRG

Canadian Geophysical Union CGU

Canadian Quaternary Association CANQUA

Société Québécois de Speleologie SQS

University of Bristol Speleological Society UBSS

PROFESSIONAL SERVICE

- Northwestern Annual Climate Change Symposium –
Global Problems, Local Solution March 8, 2012
Problems to Solutions October 18, 2010
Problems to Policy - news.medill.northwestern.edu/climatechange/page.aspx?id=145853 November 4, 2009
 Departmental coordinator full day symposium cosponsored by Department of Earth and Planetary Sciences, the Initiative for Sustainability and Energy at Northwestern (ISEN), Environmental Policy and Culture Program (EPC) and Environmental Sciences Program (ENVR SCI).
- Organizer: International Union of Speleology Field Trip** July 2009
 Post-congress field trip to the Yucatan Peninsula for ~20 international participants.
- Co-Chair Special Session (in absentia): American Geophysical Union - Acapulco** May 2006
 Paleoenvironmental Records from Cave Sediments (PP07)
- Co-Organizer: Post conference field trip, Caribbean coast of Yucatan Peninsula** April 2003
 Salt Water Intrusion & Coastal Aquifers: Monitoring, Modeling, Management. Mérida, México.
- Organizer: Conference facilities and local arrangements, Bristol, UK.** 8 March 2003
 British Cave Research Association Science Symposium held in the School of Geographical Sciences, University of Bristol.
- Chair: Biology Session & Geology Session** 27-29 September 2002
 British Cave Research Association Hidden Earth Annual Meeting, Monmouth, UK

TEACHING & ADVISING

Areas of Undergraduate and Graduate Teaching

Earth and Planetary Sciences	EARTH 102, EARTH 360, EARTH 331, 390 Hydrology, EARTH 399
Environmental Science	ENVR SCI 201, ENVR SCI 203, ENVR SCI 390, ENVR SCI 399
Civil and Environmental Engineering	CIV ENV 201
Environmental Policy & Culture	ENV POL 397-1 & 397-02
The Graduate School	TGS 519

Specific Courses Taught

EARTH 360 – Instrumentation and Field Methods Fall 2015, 2016; Winter 2018, 2019, 2021, 2022
 Previously co-taught with Dr. van der Lee. Winter 2010, Winter 2011, Spring 2012
 Practicum. Problem based learning course.
 Enrollment - 5 - 12
 Theory and practicum on electronic instrumentation for monitoring and measurement in earth sciences, including data loggers, hands-on design and construction of electronic sensors, signal processing, data management, and network design. Prerequisites: Majors/minors in EARTH or ENVR SCI, or completion of three 300-level EARTH or any other 300 level science courses, or consent of the instructor.

EARTH 390 – Topics – Hydrology Spring 2021, Winter 2023
 Enrollment – 16 in 2021, 20 in 2023
 Conceptual and quantitative knowledge of hydrology, limnology, and shallow hydrogeology. Standard equations and quantitative approaches include mass-balance modeling, flood frequency/recurrence

intervals, Darcy's law, and Fourier transform analysis on hydrological time series. Term paper or data project on approved topic of choice, using journal quality style guide.

ENVR SCI 201 (previously x-listed w/ CIV ENV) – Earth – A Habitable Planet (Intro. Earth System Science).

Lecture based class.

Spring 2013, 2014, 2015, 2016, 2017, Fall 2019

Enrollment – 50 - 100

Overview of the physical processes governing environmental systems, from lithosphere to hydrosphere to atmosphere. Physical science perspectives on current debates such as those over water resources, energy, and climate change.

ENVR SCI 203 – Humans in the Environment

Lecture based class. Enrollment ~ 65

Spring 2022, Spring 2023

Interdisciplinary study of how humans interact with the living and nonliving parts of their environment. We examine current environmental challenges, such climate change, environmental determinants of health, sustainability, energy production and conservations, environmental ethics. A case study approach and Life Cycle Assessment (LCA) will be used to emphasize the processes of scientific inquiry and discovery.

EARTH 102-6 – Climate Change: The Scientific Evidence

Winter 2015, 2016, 2017, 2018, Fall 2019

EARTH 102-6 – Voyages of Discovery

Fall 2011, Winter 2013

Freshman writing seminars. Enrollment – 15

Climate Change represents a massive global experiment with unknown consequences. In this course we will discuss the scientific evidence for modern-day global warming including melting ice sheets, long-term temperature records from ice cores and extreme weather events such as hurricanes. Current trends and the role of human activities will be examined in the context of the geologic record of natural climate variability and the feedbacks inherent in the climate system. Anticipated future impacts include droughts, floods, sea level rise, spread of infectious diseases, drinking water shortages, habitat loss, and extinctions. Given these forecasts, strategies for managing the effects of global warming will be assessed. This writing seminar specifically aims to develop effective scientific writing and visual communication for the natural and physical sciences.

EARTH 331 – Field Problems in Sedimentary Geology

Summer/Fall 2016

26-day field camp observing and mapping sections in outcrop and core in Utah and Colorado, with Fall quarter workshop class for development of research reports.

Enrollment – 6

Field methods in stratigraphy and sedimentology; interpretation of depositional systems and paleo-environments; methods of observations, data recording and analysis, and presentation of geological information (maps, cross sections). Course involves 2.5-week field trip to Colorado/Utah in late August - mid September and meets through the Fall quarter. Prerequisite: EARTH 330.

EARTH 519 – Responsible Conduct of Research

Annually from 2011 to present 2023

Coordination of the NSF mandated RCR requirements, and leading the series of discussion sections with earth-science focused material drawn from NSF, AAS, and AGU.

Enrollment – 5 – 15, including PhD students from MEAS and Plant Biology and Conservation

All EARTH Graduate Students and Post-Doctoral Fellows must complete the Responsible Conduct of Research (RCR) Training in their first year of the program. This course includes 9 online "CITI" modules as well as weekly discussion sections.

ENVR_POL 397-1 / 397-2 – Environmental Field School

Summer 2012

Field Internship with National Parks and National Forests.

Summer 2013 to present (non-credit based).

Seminar sessions and guided readings.

Other Academic Courses and Programs

Director – EPC Environmental Field School 2013 - 2018
Co- Director - EPC Environmental Field School 2012
 Placement of summer student research interns in National Parks, National Forests and closely allied federal agencies. Supervision and mentorship in research contribution spring-boarding from the experience (see ENV POL 398 under Teaching).

Co-curricular Experiential Field Trip to Yucatan Peninsula, Mexico – Lead Coordinator and Instructor
 Carbonate hydro-geochemistry & sedimentology; Coastal environments
 Field practicum. ~30% content renewal in each offering.
 Video 2009 trip - www.vimeo.com/6402811
 Video 2017 trip - <https://www.youtube.com/watch?v=1NdODr6YokA>

Year	Days	Students	Collaborating Instructional Staff
2023			Cancelled.
2022			Cancelled.
2020	8	17	Cancelled due to COVID
2019			Cancelled due to university financial restrictions.
2017	10	12	Dr. Sageman, Dr. Horton, Dr. Masterson, Ms. Schellinger
2015	10	15	Dr. Osburn, Dr. Rossi
2013	10	16	Sole faculty, and Mr. Fortwengler (Shell geologist & alumni)
2011	10	13	Dr. Bina, Dr. Jacobson, Mr. Fortwengler (Shell geologist & alumni)
2010	10	13	Dr. van der Lee, Dr. Jacobson, & Dr. Weiss (GSU faculty).
2009	8	18	Dr. Sageman and Dr. Jurdy.

Students in Tutorial or Advisory Registration 399, 499

**EARTH 399-0 - INDEPENDENT STUDY
 UNDERGRADUATE - STUDENT RESEARCH CREDIT**

Maddy BAGNALL 399 Winter and Spring 2023
 Calculation of tidal damping and lag with distance inland from the Caribbean Coast, and aquifer storativity and transmissivity coefficients. Research effort started in Winter of Sophomore year.

Lucy WEIDNER Three x 399 - Fall 2020 +Winter/Spring 2021
 Thesis: Quantifying the Yucatan Peninsula Holocene fire history and ecological succession – Charcoal and stable isotope analysis of coastal and lake cores the Vista Alegre Maritime Maya Port
 Summer 2020 Undergraduate Research Grant (URG) of \$3500 through the Baker Program in Undergraduate Research, and Lane Fund for Environmental Studies.
 Winter 2021 Academic Year Research Grant (URG) of \$1000 for stable isotope analysis.
 University of Edinburgh MS 2021 – 2022
 Now Research Associate - Climate Risk Analyst, Resilience and Adaptation at **WTW**

Isaac BEST Winter 2021
 R based dynamic front end for NU Campus climate station, with climate change context.

Timothy ELLIS Summer 2020
 Undergraduate Research Assistant Program mentee, with \$3500 award, collaboratively with Robin Mattheus, Illinois Geological Survey – ISGS). Project - Mapping the subsurface architecture of the Zion Beach Ridge Plain, Waukegan

Katherine A. **HAILE** Three x 399 Fall 2018, Winter & Spring 2019
Thesis: Coastal mangrove basin hydrological dynamics in response to changing boundary conditions of ocean and climate. *Department Honors*
Construction of Cave Pearl loggers with Atlas electrical conductivity + water level + temperature.
Fourier transform analysis on 20+ time series and determination of lags/damping.
Summer 2018 URAP – Skill acquisition in assembly of commercial multi-sensor Hydrolabs.
2018-2019 Academic year Undergraduate Research Grant (URG) \$1000 + 50% international travel for 13 days Dec. 2018 Yucatan Peninsula field campaign, followed by ~2 weeks March 2019.

Abigail **LAMMERS** 399 Winter 2018
a. Code “library” for the Arduino microcontroller board, for the calculation of flow direction and magnetometer corrections on the LSM303DLHC accelerometer, used as a pendulum flow meter.
b. Online open-source application written in R for visualization and statistical analysis of flow velocity data from open water and cave deployments.
Presented at the Geological Society of American Annual Meeting, October 2018

Peter **CARLIN** Two x 399 in Winter/Spring 2016
Field permeability assessment using open-source hardware design. URG Summer 2016
WCAS Summer Research Grant for \$3000 + 50% travel with 2 weeks field campaign in southern Mexico.
Now - Quarry Supervisor & Engineer In Training, Lehigh Hanson

Jay **LARSON** 399 in Spring 2015
Report - Yucatan Peninsula Climate Atlas.
Now - Senior Data Scientist at Zoro US

Brendan **McMANUS** 399 in Winter 2015
Report - Northwestern waste audit, including direct physical measure.
Now - Assistant Site Supervisor at Venture Outdoors

Kelly K. **CAI** Three x 399 in Fall to Spring 2014-15
Thesis - Bacteriological assessment of vadose zone connectivity at Mammoth Cave National Park, USA
Summer field experience with Environmental Field School – Mammoth Cave National Park.
Presented at the Geological Society of American North Central Meeting, May 2015
Followed by – Associate Environmental Engineer, Parsons Corp.
Now – Data analyst, Data Group at Columbia University

Henrik **WESTERKAM** One x 399 in Fall 0214
Independent research project, based on summer field experience with Environmental Field School
Report – Backcountry visitor impact assessment at Katmai National Park and Preserve and the Alagnak Wild River 2007-2014.
Followed by – NASA, the Nature Conservancy, National Park Service, National Audubon Society, University of South Carolina. Then MS Clark University. Now – National Audubon Society.

Zachary D. **KISFALUSI** Three x 399, Fall 2013 to Spring 2014
Thesis - Urban hydrology of northern Cook County
Followed by - funded MSc program in hydrology at Illinois State University.
Now – Hydrologist, USGS Colorado Water Science Center

K. T. **McMONIGAL** Four x 399 over Spring 2013 to Spring 2014
Thesis - Developing a new paleo sea level proxy: Calcite rafts of the Yucatan Peninsula, Mexico *Honors*
Undergraduate Research Grant (URG) for \$1000
WCAS Summer Research Grant for \$3000 + 50% travel.

Best Poster Award at the 2015 Northwestern University Undergraduate Research Symposium.
 Presented at the Geological Society of America (GSA) Annual Meeting, Vancouver BC Fall 2014, and GSA North Central Meeting, Madison, Spring 2015
 PhD 2020, Rosentiel School of Marine Sciences, Miami, in Physical Oceanography.
 Post-Doctoral Fellow as of 2021 – University of South Carolina
 Faculty – Assistant Professor as of 2023. University of Alaska, Fairbanks.

Ellie J. **BENSINGER** 2013 Winter
 Thesis - Variation in charcoal abundance in cores from Maya Port City of Vista Alegre, Quintana Roo. 14pp.
 Followed by – Performing professional actor – IMDB <https://www.imdb.com/name/nm3927723/>

Peter D. **ILHARDT** Three x 399 in Fall 2012 to Spring 2013
 Thesis - Investigation of potential microbialite formations from Yucatán Peninsula cenotes. 41pp.
 Department Honors, and Phi Beta Kapa (PBK) – National Academic Honor Society
 Undergraduate Research Grant (URG) for \$1000 + 50% travel.
 Post Bac - Science intern at Mammoth Cave International Center for Science and Learning (organized by Beddows).
 MSc program, Department of Geosciences, Penn State. Completed in Spring 2017.
 Now - Research Technologist, Dept. of Plant Sciences, Penn State

Alice M. **CARTER** Three x 399 in Fall 2011 to Spring 2012
 Thesis - Multiproxy reconstruction of the Alegre Maritime Maya coastal archeological site using sediment cores.
 WCAS Honors. Phi Beta Kapa.
 Awarded Undergraduate Research Grant (URG) for \$1000 + 50% travel.
 Presented at the Geological Society of America
 Peer Reviewed - Beddows, P.A., Glover, J., Rissolo, D., ***Carter, A.**, Goodman, B., Jaijel, R., Smith D. (2016) Proyecto Costa Escondida: Recent interdisciplinary research in search of freshwater along the North Coast of Quintana Roo, Mexico. *Wiley Interdisciplinary Reviews – Water*. 3(5):749-761. DOI: 10.1002/wat2.1161
 Followed by –
 Instructor Assistant / Technician, Marine Biological Laboratories Wood’s Hole +
 Field Research Technician, Toolik Field Station Alaska
 Duke University PhD in 2022
 Post Doctoral Researcher of 2022, Flathead Lake Biological Station, University of Montana

Peter E. **CARLSON** Three x 399 in Fall 2011 to Spring 2012
 Thesis - Lacustrine gypsum as a paleoprecipitation indicator in inland Belize.
 Awarded Undergraduate Research Grant (URG) for \$1000
 WCAS Honors. Phi Beta Kapa.
 Followed by - PhD program at University of Texas, Jackson School of Geoscience.
 Now – PostDoctoral Fellow, Washington University in St.Louis

Violet C. **ZERBE** One x 399 in 2011 Fall
 Independent research based on primary and historical data collection over Environmental Field School.
 Thesis - Analysis of the Francis Creek Bypass project: Evolution of an engineered alpine stream (36 pp.)

**EARTH 499-0 - INDEPENDENT STUDY
 GRADUATE - STUDENT RESEARCH CREDIT**

Anastasia **MONTGOMERY** 499 in 2020 Winter
 Matthew **SELENSKY** 499 in 2019 Fall

Karyn DeFRANCO	499 in Winter 2019, and Fall 2019
Emiliano MONROY-RIOS	Five x 499 in 2011 Spring, 2011 Fall, 2012 Winter, 2012 Fall, 2013 Winter
Gregory O. LEHN	Two x 499 in 2011 Winter, 2010 Fall

Ph.D. ADVISING AND MENTORING

Primary PhD Advisor.

Emiliano **MONROY-RIOS** – PhD Candidate, Earth & Planetary Sciences 2011- 2020
Hydrogeochemistry of the Yucatan Platform. Submarine groundwater discharge, with a focus on geological sources of phosphate. \$104 000. CONACYT Mexican Graduate Student Fellowship over 4 years.

Secondary Advisor (Mentoring Secondary Qualifying Exam Proposal)

Matthew **SELENSKY** – PhD Student, Earth & Planetary Sciences 2019 – present
Secondary advisor, with Primary advisor Prof. M. Osburn

Anastasia **MONTGOMERY** – PhD Student, Earth & Planetary Sciences 2019 – present
Secondary advisor, with Primary advisor Prof. D. Horton

Karyn **DeFRANCO** – PhD Student, Earth & Planetary Sciences 2018 – 2020
Secondary advisor, with Primary advisor Prof. A. Jacobson. MSc in Spring 2020

Greg **LEHN** – PhD, Earth & Planetary Sciences 2010 – 2016
Advisor on Second Research Proposal - Phreatic calcite rafts as a novel paleoenvironmental record of hydrochemistry and water level. Committee Member. Primary advisor Prof. A. Jacobson.

Committee Member

Ry'yan **Clark** Spring 2021 - present
MS in Plant Biology and Conservation Graduate Program
Primary Advisor – Louise Egerton Warburton

Chuxuan **Li** – PhD Candidate Fall 2020 - present
Primary Advisor – Daniel Horton

Chelsi **McNEILL** – PhD Candidate 2016 – present
McMaster University, School of Geography and Earth Sciences, Canada
Project Title - Holocene palaeo-environmental reconstruction from cenote and lake sediment cores in the Yucatan Peninsula of Mexico
Primary Advisors – Eduard Reinhardt

Fernanda **LASES FERNANDEZ** – PhD Candidate 2016 – 2020
Universidad Nacional Autónoma de México (UNAM), Centro de Geociencias, Mexico
Project Title – Vadose and groundwater hydrology of the Yucatan Peninsula - Implications for paleoclimate reconstruction from speleothem archives.
Primary Advisors – Juan Pablo Bernal Uruchurtu

Aubri **JENSON** – PhD Candidate, 2015 – 2020
Texas State University, Department of Biology, USA

Project Title - Hydrogeology and speleogenesis of the Yucatan Peninsula, Mexico.
 Primary Advisor – Benjamin Schwartz

Vivian **TANG** – PhD Candidate 2016 – Sept 2020
 Primary Advisor – Suzan van der Lee

OTHER ADVISING / MENTORING / TEACHING ROLES

Director, Environmental Science Program Fall 2019 to present
 Directorship includes full DUS role.
 100 STEM majors.

Director of Undergraduate Studies – EARTH (DUS) Winter 2011, Fall/Winter 2015-16,
 Winter 2018 to Fall 2019

Director of Graduate Studies (DGS) - EARTH Fall 2012

WCAS Freshman Advisor – as instructor on Fall writing seminar Fall 2011, Fall 2019

Curriculum Committee - member 2009 – present
 Redevelopment of undergraduate major program, with CRC approval received in 2017.
 Proactive – consultation as DUS on individual or cohort aspects for review.
 Ongoing review of curricular offering and scheduling, with present committee focus on PhD Program.

TEACHING AWARDS & HONORS

ASG – Associated Student Government – Faculty Honor Roll 2018-2019
 Recognition for work with EARTH 360: Field Methods and Instrumentation

WCAS Weinberg College Arts and Sciences Alumni Teaching Award 2015
 Recognized for excellence as undergraduate teachers. \$5000 award.

SERVICE – MEMBERSHIP & OFFICES

Department Level

Research Staff, Direct Line supervisor

Research Associate / Lab Manager	
Isotope Ratio Mass Spectrometer Lab (IRMS)	Dr. Andy Masterson
Radiogenic Lab (including class 10 clean lab)	Dr. Meagan Ankney (to Dec 2021)
Research Lab Manager / Technologist	Ms. Grace Schellinger
Research Associate / Geophysical Computing Research	Dr. Mitch Barklage – To Winter 2019

Staff - Search and Hiring Committee

Chair - IT Consultant	2013
Member, IRMS Lab Manager	2012, 2016
Member, Program Assistant	2015, 2017
Member, Business Manager	2015

- Webpage committee member, and content contributor** 2009 – Present
Active involvement with ongoing critical evaluation and renewal of content, working closely with PA.
Test department for WCAS in launching new Cascade content management system with development and trial of new department level templates. 2010
Relaunch of webpage using second generation Cascade WCAS templates. Summer/Fall 2017
- EPicentreS department annual newsletter.** 2008 – present
Contributing author, editing/proof reading
- Digital Image Asset and Database Management** 2008 – present
Collect and organize digital image assets, including recovery of historical images. Working with WCAS to coordinate ascension of key resources to the MDAM system, including with permissions and metadata. Spring 2017 - present
- Computing – committee member** 2008 – present
- Graduate recruitment – GSA Booth, social media outreach, direct mailing initiatives** 2009 – present
Goal is to significantly increase the number of URM applicants, in support of diversity graduate recruitment. 6000+ emails in 2020.
- Undergraduate Recruitment to program** 2009 – present
Active involvement with prospective undergraduate students in support of recruitment to EPS. Declared majors in EPS have approximately doubled since 2008, with more students declaring their major earlier in the program.
- WCAS – EARTH Booth at Academic Directions (Majors’s) Fair** 2010 – 2015, 2017, 2018, 2019
- Corporate Recruitment – Chevron and Shell** 2009 – 2020
Coordinated site visits of recruiters from Shell and Chevron, both of whom are EPS Alums.
Two EPS students full time hired and numerous summer internships due to these efforts.
- Education beyond the Classroom - Activities with EARTH undergraduate and graduate students – Organization & Instruction**
- Mammoth Cave National Park weekends 2011, 2012, 2014, 2019
GSA – Group conference, with specific inclusion of non-presenting undergraduates 2018
Glacial Park + Volo Bog (Joint with ISP) 2009, 2010, 2013
Chicago water ways - Kayaking Trip through Chicago 2009, 2010
+ frequent participant on trips/activities organized by others in the department for faculty/student interaction
- GIS Training Weekends for undergraduate and graduate students (2 day sessions)** 2010, 2011
Coordination with NU GIS Expert Chieko Maene for the provision of 2 day workshops in introductory GIS for earth science and plant biology and conservation science students, both undergraduate and graduate.
- Tech Infill Space Development – New office and teaching facilities** 2008 – 2013
Member of the departmental Tech-Infill space committee. Principal liaison with weekly+ interaction with FM project managers and contractors. In 2011, role as departmental liaison significantly increased, with move-in completed summer/fall 2012.
- ILEPS Development – Integrated Laboratories for Earth and Planetary Sciences** 2008 – 2011
Phased Move-In from Locy Hall to Hogan 2010 – 2013
Coordination of the design, construction, and commissioning of the new integrated laboratory. Intense coordination between FM, the design firm (HED), the contractors (Power Construction), and the leading

research faculty within Earth and Planetary Sciences, to ensure that full operation of the facilities is achieved. In 2010, four of the 6 modules reached operation. Completion of the Clean Lab and TIMS facility (A. Jacobson) and the Mineral Physics lab (S. Jacobsen) achieved in 2011. Ribbon cutting November 2011.

WCAS College Level

Director – Environmental Sciences Program Fall 2019 - present
 100+ STEM majors in program in through 2022 and 2023.
 Responsible for all aspects of final delivery of academic, financial, and community administration. Provide group and individual mentoring. Organized development opportunities along with undergraduate representatives, including regular community building activities. Typical weeks included 5-10 meetings, with peak weeks ~20.

Member, Program Faculty Committee, Environmental Sciences Program ~2010 – present
 Member, selection committee for Visiting Assistant Professor – 2 rounds 2014, and 2017

Interim Director – Environmental Sciences Program 2014 – 2015
 80+ majors active in program. Responsible for academic administration. Provided mentoring to students on request. Organized development opportunities along with undergraduate representatives. Typical weeks included 5-10 meetings, with peak weeks ~20.

University Level – Senate, Residential College

SILC - Spatial Intelligence and Learning Center 2022 - present
 Faculty member

The Graduate School (TGS) Diversity and Inclusion Council 2019 – present

Office of Fellowships 2008 – present
 Participant in mock interviews and mentorship activities of Northwestern students and recent alumni in their preparation for competition for national and international awards of prestige.

International Travel Safety Advisory Board, Office of Global Safety and Security 2015 – present
 Active committee projects include Wilderness First Aid Coordination and defining international travel with respect to Northwestern graduate students and post-docs.

Faculty Fellow, Jones Residential College for the Fine and Performing Arts 2010 – 2017
 Mentorship, including interaction with residential students over meals, at special events, and supporting personal growth and educational activities within and beyond the residential college.

Faculty Senate Elected Member, Northwestern University 2011 – 2013

Faculty Senate Benefits Committee, Northwestern University 2011 – 2013

Beyond Northwestern

NSF Summit on the Future of Undergraduate Geoscience Education 2014, 2016, 2017
 Three day workshop, hosted at the Jackson School of Geoscience, Austin.
 Topical meetings at GSA Annual Conferences.

EDUCATIONAL PUBLICATIONS
(general audience / not peer-reviewed)

Beddows, P.A. (2010) Yucatán Underground. *Canadian Caver* 71.

Beddows, P.A. (2007) Counting cave drips -An Exercise of global significance. *Canadian Caver* 64, 8-13.

Beddows, P., Smart, P., Whitaker, F. & Smith, S. (2005) ¿A donde van las aguas residuales? El acuífero cárstico de la Municipalidad de Solidaridad, Quintana Roo, México: Where does the Sewage Go? The karst groundwater system of the Municipalidad de Solidaridad, Quintana Roo, Mexico. *Revista de Medio Ambiente, Turismo y Sustentabilidad*. 1(1) 121-128.

Beddows, P.A. (2004) Cave development in continental & coastal limestone regions. In Matthes, A., et al. (eds) *IANTD Cave Diver Training Manual*, IANTD, 90–96.

Beddows, P.A. (2003) Introduction to the Yucatan Peninsula hydrogeology: A World class example of a coastal carbonate density stratified aquifer. In *Cavern Guide Training Program*, Asociación de Prestadores de Servicios Acuáticos (Riviera Maya Association of Dive & Watersports Operators - APSA) 45-54.

Beddows, P.A. (2003) Introduction to the hydrogeology of the Caribbean coast of the Yucatan Peninsula. In Ward, B. (ed) *Salt Water Intrusion & Coastal Aquifer Conference (SWICA) Field Trip to the Caribbean Coast of the Yucatan Peninsula* (April), 13-22.

COMMUNITY WORK

PUBLIC EDUCATION & OUTREACH

The Cave Pearl Project – Project page geared to educators and developers 2013 – present
~86 000 unique IP addresses a year over 2017-2018 <https://thecavepearlproject.org/>
Active reportage of the development of open source instruments using the Arduino micro-controller platform, in support of distributed and economical environmental monitoring.
Extensive content and teaching resources to enable STEM educators in adopting the platform in educational environments.

EPS Climate Station at Northwestern University 2010 – present
PI for acquisition and establishing the Northwestern Climate Station which will support undergraduate and graduate learning and research on campus, and serve as an icon or NU's commitment to earth and environmental science. Funding from ISEN secured (\$13 800). Co-development along NU CO₂ station, PI'ed by Dr. Jacobson.

Project Excite: Department of Earth and Planetary Sciences 2009 – 2015
Coordinator for faculty and graduate student led activities within the department, including 2 days of small group activities for select students from the 3rd and 4th grade from Chicago Public School district 86. Supported development of new activities by graduate students including “Global Warming in a Bottle”, “How Big is a Dinosaur”, “Deep Sea Vents”. Project Excite is collaborative project with the Northwestern Center for Talent Development (CTD), Evanston/Skokie School District 65, and Evanston Township High School District (ETHS) 202. ~50 Children IN 2009-2011, with increase to 75 in 2012.

Center for Talent Development – Coordinated with Dr. Steven McGee OF SESP 2010
NASA Summer Education Outreach – Chicago High Schools 2011
 Lead scientific advisor, and embedded scientist for this 5 week long summer effort, with 8-9 high school students from Chicago Public schools. Educational material and program development on climate change using remotely sensed and NASA data. Recruited and organized EPS graduate students to provide education extension, and pedagogical support. Ongoing work includes translation of 2010 summer experience into fixed pedagogical materials for inclusion in the Chicago Public School curriculum.

ETHS Biology internships – 7 students, 2010 & 2012
 20+ contact hours each (total 140 contact hours) providing skill developing and mentorship. Separation, cataloguing and photographic documentation, and identification of bones from cave sediments. Dendrochronology using tree sections from NU campus. Greenhouse gas in a bottle experiments.

High School Student Tours – Analytical lab facilities and collections 2010 – present
 Educational tours of research facilities with added discussion of careers in Earth Science. Support of minority inclusion in STEM fields. Typically 1-5 groups per year, with 20 participants each.

PROFESSIONAL TRAINING & SKILLS

Languages: Mother tongues of French and English, although French is now rarely used.
 Fluent in Spanish as a second language.

MBA Kellogg School of Business Certificate - Management Skills for Innovative University Leaders 2013
 NU Faculty leadership program to introduce business concepts and specific tools and frameworks for effective leadership. Selected and sponsored by WCAS. Nine days.

NU Learning, Teaching, and Assessment Forum 2013
 One day event showcasing teaching and assessment innovations, strategies, practices, and outcomes.

Grantsmanship for the Research Professional, Northwestern University 2009
 Two day course instructed by Dr. Holly Falk- Krzesinski.
 Enhancing skills for effective grant opportunity identification, preparation, writing, and submission for investigators and administrators.

Students in the lab: Quality-time or predictable demo? Centre for Leadership in Learning 2007
McMaster University. One day. Designing effective experiential learning modules in the lab and field. Three days.

Making Lecture Presentations, Centre for Leadership in Learning November 2004
McMaster University Eighteen hour enquiry based course focused on the question of "What makes for an effective lecture?" which included development of lecture skills through active participation.

Environmental Data Acquisition Training, Observatoire Royale de Belgique May 2004
 Design, construction, and implementation of data acquisition systems including data loggers and geophysical sensors. Four days.

Time Series & Tidal Analysis Methods, International Centre for Earth Tides November 2002
Observatoire Royale de Belgique. Individual training over two weeks on tidal data pre-processing and analysis. Fourteen days.

SCUBA - Cave Diver, and other technical SCUBA certifications 1996 – present
 Full Cave Diving Certification and membership - Cave Diving Section of the National Speleological Society (NSS-CDS), Full Cave Diving Certification and membership - National Association of Cave Diving (NACD). Ice Diver (ACUC). Oxygen Provider (DAN/ACUC). Nitrox enriched air (IANTD & ACUC).
 Open water SCUBA Instructor (ACUC – License and insurance lapsed 2008).

MEDIA

HELIX – Northwestern Science in Society July 22, 2019
Open-Source Underwater - Instrument design aids Northwestern professor’s exploration of underground world <https://helix.northwestern.edu/article/open-source-underwater>

Medill Reports

A Teen’s fall and death during the last ice age, by T. Chen Sept. 14, 2018
<https://news.medill.northwestern.edu/chicago/a-teens-fall-and-death-during-the-last-ice-age/>

Science and Tourism in the Rio Secreto Caves of the Yucatan Peninsula, by B. Callan June 18, 2018
<https://news.medill.northwestern.edu/chicago/science-and-tourism-explore-the-rio-secreto-caves-of-the-yucatan/>

Maritime Maya and Building an Ancient Island Pyramid, by B. Callan June 12, 2018
<https://news.medill.northwestern.edu/chicago/the-maritime-maya-and-building-an-ancient-island-pyramid/>

Hackaday.com – Underwater logging for Science, by Al Williams Feb. 16, 2018
 Prominent online tech ‘zine review of the Cave Pearl project and publication.
<https://hackaday.com/2018/02/16/underwater-logging-for-science/>

Adafruit.com - Submersible Data Logger Systems from the Cave Pearl Project Dec. 22, 2017
 #CitizenScience #underwater #arduino
<https://blog.adafruit.com/2017/12/22/submersible-data-logger-systems-from-the-cave-pearl-project-citizenscience-underwater-arduino/>

The Cave Pearl Project Interviews – YouTube Sept. 2015
 Developing and open source Arduino based data logger system for underwater research.
 Length 7:03. Over 1600 views by end of 2017.
<https://www.youtube.com/watch?v=kJGhwMB4eew>

WTTW – Chicago Tonight - Diving for Bones. Live broadcast. Length: 11:48. May 27, 2014
<http://chicagotonight.wttw.com/2014/05/27/diving-bones>

Women in Science Magazine (AWIS) - Diving into the Underground for Research. Summer 2014
<http://magazine.awis.org/i/330312-summer-2014/34> pgs. 34-37

Northwestern Magazine – Cave Woman (Feature article) by Elizabeth Blackwell. Fall 2014
<http://www.northwestern.edu/magazine/fall2014/feature/cave-woman.html>

Northwestern University Office for Research - Center Piece Magazine, Connecting Caves to Coral Reefs, pgs. 30-34. Fall 2014
https://issuu.com/northwesternuniversityresearch/docs/cp_fall2014

Eureka Alert - One of oldest human skeletons in North America is discovered, 15 May 2014
https://www.eurekaalert.org/pub_releases/2014-05/nu-ooo051314.php

Helix Magazine for Science in Society

Cave diving Northwestern geologist found her calling as a kid, by W. Schutt June 18, 2014
<https://helix.northwestern.edu/article/cave-diving-northwestern-geologist-found-her-calling-kid>

and cross-pub – Medill Reports

<http://newsarchive.medill.northwestern.edu/chicago/news-231337.html> June 11, 2014

The Daily Northwestern. Northwestern professor contributes research on one of the oldest skeletons in North America. By Rebecca Savransky May 19, 2014

<http://dailynorthwestern.com/2014/05/20/campus/northwestern-professor-contributes-research-on-one-of-the-oldest-skeletons-in-north-america/>

NOAA Ocean Exploration - Signature Exploration 2011

Selected for full media presence development by NOAA for Exploring the Hidden World of the Maritime Maya - Contributing Author and Co-PI on project.

<http://oceanexplorer.noaa.gov/explorations/11maya/welcome.html>

International Research Press Coverage - 5 newswires by United Nations University 2011

Featuring publication of “Contaminants in the coastal karst aquifer systems along the Caribbean coast of the Yucatan Peninsula, Mexico”, including to Reuters (English, French, Spanish), United Press International, AFP Press Agency, EFE, IPS. Press generated in excess of 200 online story derivatives from 32 countries, and print distribution of 2.5 million readership.

e.g. <http://www.sciencedaily.com/releases/2011/02/110206132900.htm>

Press “Who knew Northwestern University had its own glacier? And now it's melting fast” 2011

Instigated and supported writing of article on the Northwestern Glacier by Chris Bentley, for Medill Report
<http://news.medill.northwestern.edu/chicago/news.aspx?id=178796>

National Geographic “Diver Vanishes into Portal to the Maya Underworld” 2010

Video - <http://video.nationalgeographic.com/video/player/news/history-archaeology-news/belize-maya-pools-vin.html>

Ranking - <http://news.nationalgeographic.com/news/2010/11/101130-best-news-videos-2010-science-nature-watch/>

Second most watched video in 2010 on National Geographic online. Length 3:43.

EPS Yucatan 2009 Video “Fun, Sun, and Science” 2010

Coordinated production of documentary short film of the EPS experiential educational trip to the Yucatan Peninsula Mexico. Produced by Lauren Pond.

Awarded **First Place**, in the American Geological Institute Life in the Field Video Contest. Length 5:38.
<http://www.vimeo.com/6402811>

National Geographic contracted to Sea Studios of Monterrey 2007 – 2008

a. Dirty Secrets Released 2008. An episode of National Geographic's Strange Days on Planet Earth. On-camera scientist and scientific advisor.

b. Coral Connections Released 2008. Scientific advisor.

CBC - "Cave Research - Paleoenvironmental research in Rats Nest Cave" 2006

On-camera scientist and research consultant. Aired nationally on Saturday Report + Provincially in Alberta on CBC News at Six in both Edmonton and Calgary.

BBC Natural History Unit, Bristol, U.K.

2004 – 2005

Secrets of Mayan Underworld Released 2005. Scientific advisor.

BBC Natural History Unit, Bristol, U.K.

2004 – 2006

Planet Earth: Caves Released 2006. Scientific advisor.