

2008 DISCCRS IV Symposium

Participant Directory

PhD Citaton, Interests

Bancroft, Betsy A

College of Forest Resources
University of Washington
College of Forest Resources, WFS 209
Box 352100
Seattle, WA 98195-2100
USA

Tel: 206-543-5772

Web: <http://faculty.washington.edu/betsyba/>

E-m: betsyba@u.washington.edu

Bio/Ecol
ecol



Bancroft, Betsy A. 2007. Ultraviolet-B radiation as an environmental stressor of amphibians.
Oregon State University (USA)

I am interested in the effects of stressors in natural and human-dominated ecosystems. Organisms within these ecosystems frequently encounter several different stressors over days, months, or a lifetime. My work centers on understanding how these stressors may interact and the resulting effects of these stressors on population dynamics.

Bergin, Michelle S

Air Protection Branch
Georgia Environmental Protection Division
4244 International Parkway
Suite 120
Atlanta, GA 30354
USA

Tel: 404-362-4569

Web:

E-m: michelle.bergin@dnr.state.ga.us

Atmos
eng



Bergin, Michelle S. 2006. Regional air quality: Photochemical modeling for policy development and regulatory support.
Georgia Institute of Technology (USA)

I apply science and engineering tools in control strategy analysis to develop and implement effective approaches to reduce anthropogenic impacts on the atmosphere. My past research includes the use of computational models with uncertainty and sensitivity analysis to reduce ozone and aerosol pollution and to guide transboundary atmospheric policy development.

Bert, Federico E

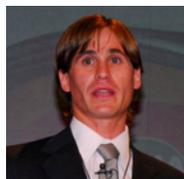
Agronomy
University of Buenos Aires
Av. San Martin 4453
P.O. Box C1417DSE
Ciudad Autonoma de Buenos Aires 1417
Argentina

Tel: 54-11-4524-8039

Web:

E-m: fbert@agro.uba.ar

Soc
ecol



Bert, Federico E. 2007. An assessment of opportunities and impediments for the use of climate information in agricultural systems of the pampas.
University of Buenos Aires (Argentina)

I am interested in the implications of interactions between uncertain future climate trajectories, awaited technological developments and individual decision-making in agricultural systems: emerging patterns of land use, land tenure and sustainability of product. Interdisciplinary research as a way to cope with complex problems of complex systems.

Block, Paul J

International Research Institute for Climate and Society
Columbia University, Lamont Campus
61 Route 9W, Monell Bldg.
Palisades, NY 10964
USA

Tel: 845-680-4504

Web: <http://iri.columbia.edu/>

E-m: pblock@iri.columbia.edu

Ear/Hydro/Paleo
eng



Block, Paul J. 2006. Integrated management of the Blue Nile basin in Ethiopia: Precipitation forecast, hydropower, and irrigation modeling.
University of Colorado at Boulder (USA)

My primary research interests lie at the nexus of climate and hydrology/water systems, addressed through a climate risk-management framework. Additionally, filling the void between recognition and incorporation of climate change issues by translating information into a serviceable format for non-climate scientists is also of interest.

BurnSilver, Shauna B

School of Natural Resources & Agricultural Sciences, Institute of Arctic Biology
University of Alaska at Fairbanks
PO Box 757000
Fairbanks, AK 99775-7000
USA

Tel: 907-474-1501

Web:

E-m: ffsbb@uaf.edu

Soc
anthro



BurnSilver, Shauna B. 2007. Pathways of continuity and change: Diversification, intensification and mobility in Maasailand, Kenya.
Colorado State University (USA)

My PhD work on land tenure and pastoral livelihoods in East African rangelands led to research with the goal of quantifying the effects of climatic and economic drivers on sharing networks (i.e. social capital mechanisms) and livelihoods in Arctic communities. The link is an interdisciplinary focus on human ecological responses to drivers of change.

Participant Directory

PhD Citaton, Interests

Chen, Yihsu
 Sierra Nevada Research Inst., Sch. of
 Social Sci., Humanities & Arts and Sch. of
 Environ.
 University of California at Merced
 5200 N. Lake Rd.
 Merced, CA 95343
 USA
 Tel: 209-228-4102
 Web: <http://faculty.ucmerced.edu/ychen/>
 E-m: yihsu.chen@ucmerced.edu

Soc
econ



Chen, Yihsu. 2006. Analyzing interaction of electricity markets and environmental policies using equilibrium models. Johns Hopkins University (USA)

I'm interested in studying the economic, environmental and public health implications of air pollution policies. My recent work involves examining pollution leakage, emissions spillover, and contract shuffling under AB32 and RGGI emission trading policies as well as implications of recharging PHEVs on electricity prices and regional air pollution.

Gutierrez, Maria
 IISD Reporting Services – United Nations
 Office
 International Institute for Sustainable Development
 300 East 56th St. Apt. 11A
 New York, NY 10022
 USA
 Tel: 212-995-0107
 Web: <http://www.iisd.ca/>
 E-m: findmariag@gmail.com, maria@iisd.org

Soc
anthro



Gutierrez, Maria. 2007. All that is air turns solid: The creation of a market for sinks under the Kyoto Protocol on climate change. City University of New York (USA)

I am interested in the production of nature - in particular how land and trees are conceptualized and commoditized to enter the climate change regime and the implications of such process on the ground. I am also interested in the application of an eco-system approach to adaptation.

Hastings, Meredith G
 Department of Geological Sciences
 Brown University
 324 Brook Street, Box 1846
 Providence, RI 02906
 USA
 Tel: 401-863-3658
 Web: <http://www.geo.brown.edu/Faculty/MGH.htm>
 E-m: Meredith_Hastings@brown.edu

Atmos
biogeochem



Hastings, Meredith G. 2004. Studies of reactive nitrogen in the atmosphere using global modeling and stable isotope measurements. Princeton University (USA)

My research aims to elucidate connections between air quality, climate and changes in the biosphere. My tools include isotopic measurements and global modeling, currently centered on the impacts, sources and chemistry of nitric acid deposition. My research involves expertise in atmospheric sciences and biogeochemistry.

Hurteau, Matthew D
 National Institute for Climatic Change
 Research, Western Region
 Northern Arizona University
 Box 6077
 Flagstaff, AZ 86011
 USA
 Tel: 928-523-0497
 Web: <http://oak.ucc.nau.edu/mdh22/>
 E-m: Matthew.Hurteau@nau.edu

Bio/Ecol
ecol



Hurteau, Matthew D. 2007. The effects of climate change and nitrogen deposition on the Sierran mixed-conifer understory plant community. University of California at Davis (USA)

My research focus is on the impacts of climate change on fire prone forested systems. I utilize field and modeling studies to identify diversity, productivity, and carbon cycle responses to changing climatic conditions and fire regimes.

Hutyra, Lucy R
 Department of Urban Design and Planning
 University of Washington
 3949 15th Ave. NE
 Box 355740
 Seattle, WA 98105
 USA
 Tel: 206-685-9693
 Web: <http://www.urbaneco.washington.edu/>
 E-m: lucynko@hotmail.com, lrhutyra@u.washington.edu

Ear/Hydro/Paleo
ecol



Hutyra, Lucy R. 2007. Carbon and water exchange in Amazonian rainforests. Harvard University (USA)

My dissertation research looked at carbon and water exchange dynamics in the Amazonian rainforest. My current research interests focuses on the other end of the development spectrum looking at urban carbon dynamics and patterns of land cover change.

2008 DISCCRS IV Symposium

Participant Directory

PhD Citaton, Interests

Jessup, Christine M

Division of Epidemiology and Population Studies
NIH - Fogarty International Center
16 Center Drive, Room 202
Bethesda, MD 20892
USA

Tel: 301-496-1932

Web:

E-m: jessup.christine@gmail.com

Bio/Ecol
ecol



Jessup, Christine M. 2006. Asking big questions of small worlds: The ecology and evolution of microbial host-parasitoid interactions.
Stanford University (USA)

I am interested in effects of environment on microbial interactions. I currently combine evolutionary ecology, mathematical modeling and epidemiology to investigate the effects of environment on microbial diseases. I am also engaged in policy-related work that aims to advance the research agenda associated with the health impacts of climate change.

Kardol, Paul

Environmental Sciences Division
Oak Ridge National Laboratory
PO BOX 2008 MS 6422
Oak Ridge, TN 37821
USA

Tel: 865-574-7844

Web: <http://www.nioo.knaw.nl/PPAGES/pkardol/#sp>

E-m: kardolp@ornl.gov

Bio/Ecol
ecol



Kardol, Paul. 2007. Plant and soil community assembly in secondary succession on ex-arable land: Fundamental and applied approaches.

Wageningen University / Netherlands Institute of Ecology (NIOO-KNAW) (Netherlands)

My research focuses on 1) the role of soil organisms, particularly micro-organisms and nematodes, in spatio-temporal plant community dynamics and ecosystem functioning, and 2) the effect of environmental and climatic changes, such as elevated levels of atmospheric CO₂, warming, and altered patterns of precipitation, on biotic and abiotic plant-soil feedbacks.

Landerer, Felix W

NASA Jet Propulsion Laboratory
4800 Oak Grove Dr.
M/S 238-646
Pasadena, CA 91109-8099
USA

Tel: 818-354-2242

Web: www.mpimet.mpg.de/~landerer.felix

E-m: Felix.W.Landerer@jpl.nasa.gov

Ear/Hydro/Paleo
geophys



Landerer, Felix W. 2007. Sea level and hydrological mass redistribution in the Earth system: Variability and anthropogenic change.

University of Hamburg (Germany)

My research centers around sea level change, its variability on short and longer time scales, its physical mechanisms, its relation to ocean circulation changes as well as its impact on Earth rotational parameters. As a tool, I have been using coupled atmosphere-ocean general circulation models extensively.

Littell, Jeremy S

JISAO CSES Climate Impacts Group
University of Washington
3737 Brooklyn Ave. NE
Box #355672
Seattle, WA 98195-5672
USA

Tel: 206-221-2997

Web: <http://staff.washington.edu/jlittell/Site/Home.html>

E-m: jlittell@u.washington.edu

Bio/Ecol
ecol



Littell, Jeremy S. 2006. Climate impacts to forest ecosystem processes: Douglas-fir growth in northwestern U.S. mountain landscapes and area burned by wildfire in Western U.S. ecoprovinces.

University of Washington (USA)

I study the impacts of climate change and variability on forest and mountain ecosystems. Specifically, I am interested in the biophysical mechanisms relating climate to ecohydrology, wildfire, tree establishment (especially at upper treeline), plant growth, and biogeography. I am also interested in paleoecology, ecological complexity, and theoretical ecology.

2008 DISCCRS IV Symposium

Participant Directory

PhD Citaton, Interests

Lucas, Lisanne (Sandy) E Ear/Hydro/Paleo
Climate Program Office phys
NOAA - National Oceanic and Atmospheric
1315 East-West Hwy, Room 12712
Silver Spring, MD 20910
USA

Tel: 301-734-1253
Web: <http://www.cpo.noaa.gov/>
E-m: sandy.lucas@noaa.gov



Lucas, Lisanne (Sandy) E. 2007. Mechanisms governing sea surface temperature anomalies in the eastern tropical Pacific Ocean associated with atmospheric intraseasonal variability. Stony Brook University (USA)

My current interest is climate science, policy and the public including the transformation of climate research to relevant information for use by society to better plan, prepare and respond. My dissertation deals with atmosphere-ocean interaction, short-term climate variability (Madden-Julian Oscillation), and how it might influence the initiation of El Niño.

Maraseni, Tek N Soc
Australian Centre for Sustainable econ
Catchment-Condamine Alliance
University of Southern Queensland
Toowoomba
Queensland 4350
Australia

Tel: 61-7-46312995
Web: <http://www.usq.edu.au/acsc/default.htm>
E-m: maraseni@usq.edu.au



Maraseni, Tek N. 2007. Re-evaluating land use choices to incorporate carbon values: A case study in the South Burnett region of Queensland, Australia. University of Southern Queensland (Australia)

My interests are assessing soil carbon benefits with respect to: (1) soil health; (2) water holding capacity and plant available water capacity; (3) soil erosion control; (4) soil workability (cultivation cost); and (5) productivity, individually, and collectively to the gross margin. Other interests are assessing and recommending better land use system by incorporating greenhouse gases and traditional benefits with respect to changing climate.

Marin-Spiotta, Erika Ear/Hydro/Paleo
Geography ecol
University of California at Santa Barbara
1832 Ellison Hall
Santa Barbara, CA 93106-4060
USA

Tel: 510-932-4771
Web: www.marinspiotta.com
E-m: ems@geog.ucsb.edu



Marin-Spiotta, Erika. 2006. Controls on above and belowground carbon storage during tropical reforestation. University of California at Berkeley (USA)

I am interested in how changes in climate, land-use, and land-cover alter the timing and magnitude of carbon and nutrient fluxes between soils, the biosphere, atmosphere, and hydrosphere. My research also addresses legacies of human disturbance on ecosystem structure and function, through changes in species composition and biogeochemical cycling.

McKinley, Duncan C Bio/Ecol
Smithsonian Environmental Research bio
Center
Smithsonian Institution
647 Contees Wharf Road
Edgewater, MD 21037
USA

Tel: 443-482-2475
Web: <http://www.serc.si.edu/>
E-m: mckinleyd@si.edu



McKinley, Duncan C. 2006. Consequences of conversion of native mesic grassland to coniferous forest on soil processes and ecosystem C and N storage. Kansas State University (USA)

I am interested in linkages between nutrient cycling and plant productivity in response to various forms of global environmental change. I currently study the long-term effects of elevated atmospheric CO₂ on soil carbon and nitrogen cycling, with a focus on nutrient constraints on whole ecosystem responses to elevated CO₂.

2008 DISCCRS IV Symposium

Participant Directory

PhD Citaton, Interests

Medina-Elizalde, Martin A

Geosciences
University of Massachusetts
611 North Pleasant St.
233 Morrill Science Center
Amherst, MA 01003
USA

Tel: 413-658-8105

Web:

E-m: mmedina@geo.umass.edu

Ear/Hydro/Paleo
geophys



Medina-Elizalde, Martin A. 2007. The thermal evolution of the western equatorial Pacific warm pool during the Pleistocene and late Pliocene epochs.
University of California at Santa Barbara (USA)

I am interested in the fields of Paleoclimatology and Paleoceanography. I utilize geochemical tools (proxies) on various archives (e.g. stalagmites and ocean sediments) to reconstruct past climates. The goal of my research is to understand how different factors (e.g. greenhouse gases) have driven climate variability on various time scales.

Melamed, Megan L

Centro de Ciencias de la Atmosfera
Universidad Nacional Autónoma de México
Circuito Exterior s/n, Ciudad Universitaria
Mexico, DF 04510
Mexico

Tel: 303-242-5436 (US)

Web:

E-m: Megan.Melamed@gmail.com

Atmos
chem



Melamed, Megan L. 2006. Aircraft based ultraviolet spectroscopy measurements of sulfur dioxide emissions from point sources.
University of Colorado at Boulder (USA)

Currently I research emission sources and transport of air pollution in the Mexico City Metropolitan Area. In the future, I hope to work within an interdisciplinary group researching and implementing effective air pollution and climate change mitigation protocols in Latin America.

Michaud, Kristy E. H

Political Science
California State University at Northridge
18111 Nordhoff Street
Northridge, CA 91330-8254
USA

Tel: 818-677-4773

Web: <http://www.csun.edu/~kmichaud/>

E-m: kristy.michaud@csun.edu

Soc
pol



Michaud, Kristy E. H. 2007. Climate change beliefs and energy policy preferences among Californians: The role of trust.
University of California at Santa Barbara (USA)

My research focuses on the politics and policy of climate change and energy. Specifically, I study public opinion on climate change and the way that values and trust influence the public's understanding of and beliefs about climate change. I also examine public support for climate change and energy policies.

Mignone, Bryan K

Energy Security Initiative
Brookings Institution
1775 Massachusetts Avenue NW
Washington, DC 20036
USA

Tel: 609-240-6287

Web: <http://www.brookings.edu/experts/m/mignoneb.aspx>

E-m: bmignone@brookings.edu

Soc
biogeochem



Mignone, Bryan K. 2006. Scientific and political economic constraints on the solution to the global warming problem.
Princeton University (USA)

As a former staffer on the Senate Energy Committee and as current Research Director for the Brookings Energy Security Initiative, I am interested in translating knowledge about the energy and climate system into policy-relevant conclusions. My own research currently focuses on the design of domestic regulatory responses to the climate problem.

Misarti, Nicole

Center for Archaeological Materials and
Applied Science
Idaho State University
PO Box 85096
Fairbanks, AK 99708
USA

Tel: 907-687-4719

Web:

E-m: misarti3@gmail.com, n.misarti@uaf.edu

Ear/Hydro/Paleo
ecol



Misarti, Nicole. 2007. Six thousand years of change in the Northeast Pacific: An interdisciplinary view of maritime ecosystems.
University of Alaska at Fairbanks (USA)

Research Interests: How disciplines such as marine science, limnology and archaeology can tell us how the North Pacific marine ecosystem and climate changed over the Holocene and how that affected humans and how humans affected climate and ecosystem change throughout the same time period.

2008 DISCCRS IV Symposium

Participant Directory

PhD Citaton, Interests

Olabisi, Laura Schmitt

Ecosystem Science & Sustainability Initiative
University of Minnesota
200 Hodson Hall
1980 Folwell Ave.
Saint Paul, MN 55108
USA

Tel: 612-624-6709
Web:
E-m: schm2105@umn.edu

Bio/Ecol
ecol



Olabisi, Laura Schmitt. 2006. Soil erosion, poverty and sustainability: A biophysical model of a rural Philippine economy.
State University of New York (USA)

My research has two foci: one concerns the dependence of human economies and societies on material and energy flows provided by 'natural' systems, while the other involves integrating different forms of knowledge for enhancing societal capacity to develop sustainably and to adapt to change.

Peltier, Richard E

Department of Environmental Medicine
NYU School of Medicine
57 Old Forge Road
Room 270
Tuxedo, NY 10987
USA

Tel: 845-731-3652
Web:
E-m: richard.peltier@nyumc.org

Atmos
chem



Peltier, Richard E. 2007. Ambient submicron particle composition in North America: Their sources, fate, and impact.
Georgia Institute of Technology (USA)

I specialize in measuring the specific chemical components of aerosols in the atmosphere. My interests are in applying new measurement technologies to broaden our understanding of which chemical components are most responsible for causing human morbidity and mortality, ideally leading to efficient, and effective, mitigation strategies

Petes, Laura E

FSU Coastal & Marine Laboratory
Florida State University Coastal & Marine Laboratory
3618 Highway 98
St. Teresa, FL 32358-2702
USA

Tel: 850-697-4099
Web: <http://www.marinelab.fsu.edu/faculty/petes.aspx>
E-m: lpetes@bio.fsu.edu

Bio/Ecol
ecol



Petes, Laura E. 2007. Effects of environmental stress on intertidal mussel reproduction.
Oregon State University (USA)

My approach merges the fields of physiology and ecology to determine the sublethal effects of stress on marine organisms at multiple scales, from the individual to the community. Currently, I am investigating the effects of upstream drought-related water shortages on downstream estuarine oyster health.

Randles, Cynthia A

NASA Postdoctoral Program
NASA Goddard Space Flight Center
Mail Code 613.3
Greenbelt, MD 20771
USA

Tel: 301-614-6047
Web:
E-m: Cynthia.A.Randles@nasa.gov

Atmos
radiation/cli



Randles, Cynthia A. 2007. Impacts of carbonaceous aerosols on climate: Examination of the sensitivity of simulated regional climates to absorbing and scattering aerosols.
Princeton University (USA)

My modeling research focuses on understanding the impacts of human-emitted, light absorbing particles (aerosols) from both fossil and biofuel sources. These particles can impact the Earth's climate, air quality, human, health, agricultural production, and may also be altering important large-scale precipitation patterns such as the southeast Asian monsoon.

Sato, Noriyuki

Department of Geography and Planning
California State University at Chico
400 West First Street
Butte Hall 535
Chico, CA 95929-0425
USA

Tel: 530-898-6219
Web: <http://www.csuchico.edu/geop/>
E-m: nsato2@csuchico.edu

Soc
geog



Sato, Noriyuki. 2008. Impacts of climatic change and variability on winter-road maintenance in North America.
Indiana University Bloomington (USA)

My research focuses on interactions between changing climate and transportation systems. Particular attention goes to the subject of winter-road maintenance. I investigate how any change in the probability distribution of climate variables would affect both road users' adjustments to and maintenance providers' preparedness for changing winter-weather events.

Participant Directory

PhD Citaton, Interests

Saulnier-Talbot, Emilie G
Biology
McGill University
1205 Docteur-Penfield
Montréal, Québec H3A 1B1
Canada

Ear/Hydro/Paleo
geog



Saulnier-Talbot, Emilie G. 2007. Impacts of postglacial climate evolution on the the lakes of northernmost Ungava, Québec (Canada).
Université Laval (Canada)

Tel: 514-398-4117
Web: http://biology.mcgill.ca/faculty/gregory_eaves/;
<http://biology.mcgill.ca/faculty/chapman/members.html>
E-m: emilie.saulnier-talbot@mcgill.ca

In the aim of developing sustainable strategies for conservation, I use a multi-proxy paleolimnological approach to define the long-term effects of environmental variability and anthropogenic activities, including climate change, on the structure and evolution of in-land aquatic ecosystems. My study sites range from high latitude to tropical settings.

Schwartz, Miguel J
Department of Plant Sciences
Tel Aviv University
Britannia 612
Tel Aviv 69978
Israel

Bio/Ecol
ecol



Schwartz, Miguel J. 2007. Vegetation community change over decadal and century scales in the North Carolina piedmont.
Duke University (USA)

Tel: 919-416-3333 (VOIP, US line)
Web:
E-m: mjs21@duke.edu

My research aims to better understand the effect of changing precipitation regimes on natural systems. Currently I am focusing on natural plant communities in Israel, where we are manipulating rainfall and species composition in order to help anticipate what the future may bring in this water controlled and highly biodiverse region.

Selin, Noelle Eckley
Earth, Atmospheric and Planetary Sciences
Massachusetts Institute of Technology
77 Massachusetts Avenue, Building 54-1715
Cambridge, MA 02139
USA

Atmos
chem



Selin, Noelle Eckley. 2007. Mercury in the global atmosphere: Chemistry, deposition, and land-atmosphere interactions.
Harvard University (USA)

Tel: 617-324-2592
Web: <http://web.mit.edu/selin/www>
E-m: selin@mit.edu

My research focuses on atmospheric pollution issues such as climate change, mercury pollution, chemicals, and air pollution-climate interactions. Specific topics include: biogeochemical mercury cycling; urban impacts of ozone and particulates; and persistent organic pollutants. I combine research approaches from natural and social sciences (atmospheric modeling, economic modeling and policy analysis).

Sharma, Sapna
Département de sciences biologiques
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal, Québec H3C 3J7
Canada

Bio/Ecol
ecol



Sharma, Sapna. 2007. The effects of climate change on the northward range expansion of the smallmouth bass (*Micropterus dolomieu*) and the consequential impacts on native fish populations.
University of Toronto (Canada)

Tel: 514-343-6111 x 1233
Web:
E-m: sapna.sharma@umontreal.ca

My research interests entail effectively predicting the effects of climate change and other environmental stressors on ecological processes to elucidate how ecological systems and species will respond to changing abiotic and biotic stressors, particularly in vulnerable northern environments. I am also interested in environmental public outreach.

2008 DISCCRS IV Symposium

Participant Directory

PhD Citaton, Interests

Stearns, Leigh A

Climate Change Institute
University of Maine
5790 Bryand Global Science Center
Orono, ME 04469
USA

Ear/Hydro/Paleo
geol



Stearns, Leigh A. 2007. Outlet glacier dynamics in East Greenland and East Antarctica.
University of Maine (USA)

Tel: 207-581-1491
Web: http://www.geology.um.maine.edu/user/Leigh_Stearns/index.html <http://www.climatechange.umaine.edu/glaciology/leigh.html>
E-m: leigh.stearns@maine.edu

My research interest is in glaciers and ice sheets and their response to current and past climate change. The role that ice sheets play in modulating global sea level rise depends largely on the dynamics of large outlet glaciers. I use field methods and satellite imagery to study the dynamics of these large glaciers in both Greenland and Antarctica.

Wang, Xianfeng

Department of Geology & Geophysics
University of Minnesota
108 Pillsbury Hall
310 Pillsbury Drive SE
Minneapolis, MN 55455
USA

Ear/Hydro/Paleo
geol



Wang, Xianfeng. 2006. Late Quaternary climate changes in Brazil recorded by speleothems.
University of Minnesota at Twin Cities (USA)

Tel: 612-624-9598
Web:
E-m: wang0452@umn.edu

My research focuses on late Quaternary climate reconstruction through cave calcite deposits, with particular interest in abrupt climate change that occurs on decadal-to-millennial timescales, and the timing and relationship between the tropical and the high-latitude abrupt climate events.