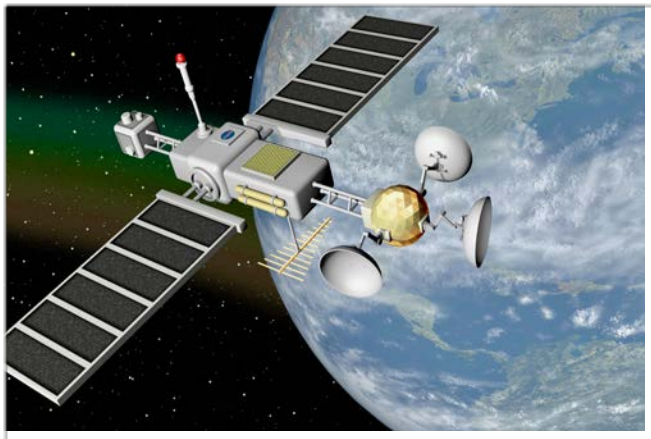
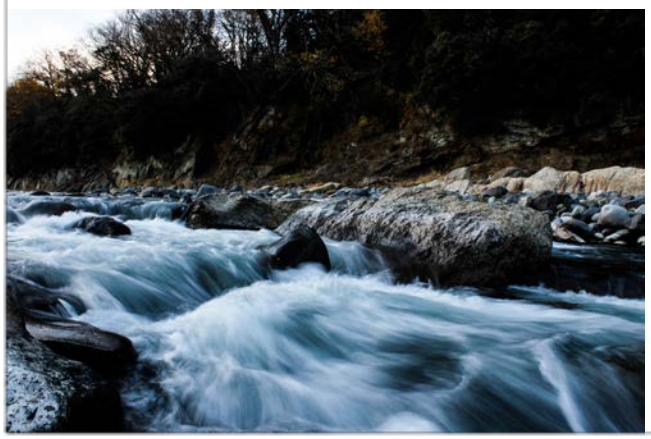
University of Colorado **Boulder**

GEOGRAPHY

Advising Guide

Academic Year 2018 - 2019





General Information for Geography Majors

Are you interested in an exciting education that integrates the study of human activity and the natural environment? If so, Geography may be for you! There are many opportunities for field trips and other forms of hands-on learning including internships and participating in faculty research. Our outlook and curriculum spans perspectives from the natural sciences, social sciences, and humanities while providing rigorous training in important skills desired by many employers.

The Department of Geography offers courses in:

- human geography including political, cultural, development, feminist, population, and urban geography;
- environment and society geography including political ecology, natural hazards, and conservation practice;
- physical geography including climatology, geomorphology, hydrology, and biogeography;
- geographic information science including spatial analysis using GIS, remote sensing, and cartography.

The Department of Geography also offers regionally focused courses on mountain geography and geographies of China, Latin America, Africa, and South Asia. To complement its curriculum, the department also offers internship opportunities and encourages study abroad for geography majors.

Advising

Geography majors are advised by staff advisors in the Advising Center for Excellence. In addition to technical and Arts and Sciences degree requirement advising, academic advisors are available to:

- work with students to assist in planning their academic career;
- discuss potential study abroad programs;
- refer students to campus resources for academic and personal assistance;
- determine if transfer credits can be applied toward the geography major;
- provide information on course offerings prior to schedule publications;
- provide recommendations and alert students to available positions.

Students are encouraged to meet with their academic advisor at least once each semester.

Special Notes

Minor – A minor in geography is available. A minimum of 18 credit hours in Geography is required, including a minimum of 9 upper-division credit hours.

Hydrology Certificate – designed for Geography majors or minors who wish to specialize in hydrology. Course requirements are designed to provide students wishing to pursue the field of hydrology and other water-related fields resources beyond the undergraduate degree (graduate school, government employment,

consulting jobs) with a broad-based background in this discipline. Upon completion of the required courses and graduation from the Geography Department, students receive a signed certificate of completion.

GIS Certificate – The undergraduate certificate in GIS and Computational Science will teach students to identify, analyze and understand spatial patterns, with an emphasis on computation and analytical problem solving. Required coursework in GIS, basic statistics, and basic programming, coupled with advanced electives in GIScience will give students the computational knowledge and skills to tackle society's important and pressing environmental problems.

Honors – The Geography Department, in concert with the Honors Program gives undergraduate majors the option to write and defend an honors thesis in an attempt to graduate with Latin honors: *cum laude*, *magna cum laude*, or *summa cum laude*.

Internship – The department's internship program (course GEOG 3930) is an important way to supplement your academic work. Internships are a great way to start building a resume, make connections, and gain valuable experience.

Independent Study – Undergraduate Independent Study (GEOG 3840) is available by arrangement with a faculty member. Up to 8 hours of geography independent study may be counted toward the major.

Career Planning – The range of jobs in geography is astounding! Follow your intellectual passions; you can be sure that there is a career in that area of geography. Do you love mapping? Hydrology? Urban planning? Fire ecology? Soil analysis? African development? Snow? Business? Travel? Environmental conservation? Teaching children? Somewhere there is a job in your area of interest.

The Geography Department hosts an annual Career Night in the spring. This event provides an opportunity to hear from, and talk to, professionals in various occupations about career and internship opportunities available in the field of geography.

The following sources are a great place to start looking for the ideal job:
- The Association of American Geographers website aag.org
- Oklahoma State University website geog.okstate.edu
- CU website colorado.edu/geography/why-cu-geography

Graduate School – If you plan to pursue graduate studies in geography, you should take additional course work in your area of concentration and interest, meet with your academic advisor, and consult with faculty members who have similar interests well in advance of graduation.

Undergraduate Degree

The College of Arts and Sciences, Department of Geography offers a bachelor of arts (B.A.) degree in geography. Geography majors may elect to complete a track in one of four areas: GIScience, physical geography, environment & society geography, and human geography.

Degree Requirements

- All Geography majors must take a minimum of 37 credits in the Geography Department
- 23 of these 37 credits must be upper-division (numbered 3000 or higher)

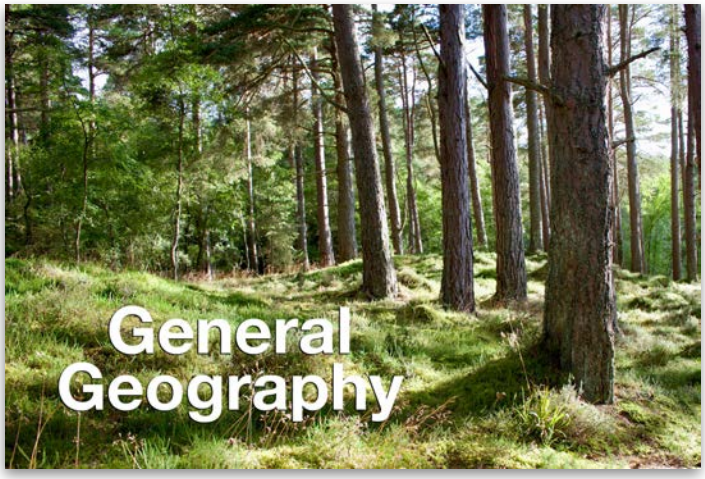
Required Courses – All Tracks

- GEOG 1001 (4) Environmental Systems: Climate and Vegetation
- GEOG 1011 (4) Environmental Systems: Landscapes and Water
- One of the following human geography courses:
  - GEOG 1962 (3) Geographies of Global Change
  - GEOG 1972 (3) Environment-Society Geography
  - GEOG 1982 (3) World Regional Geography
  - GEOG 2092 (3) Advanced Introduction to Human Geography
- GEOG 3023 (4) Statistics for Geography
- One of the following mapping courses:
  - GEOG 2053 (3) Mapping a Changing World
  - GEOG 3053 (4) Cartography I: Visualization and Information Design
- One of the following methods courses:
  - GEOG 4023 (4) Introduction to Quantitative Methods in Geography (prereq GEOG 3023 (4))
  - GEOG 4093 (4) Remote Sensing of the Environment
  - GEOG 4103 (4) Introduction to Geographic Information Science (prereqs: GEOG 3053 (4) and GEOG 3023 (4) or equivalent introductory statistics course)
  - GEOG 4173 (3) Research Seminar
  - GEOG 4563 (3) Earth Analytics
  - GEOG 4722 (3) Field Methods in Human Geography

The student must earn a grade of C- or better in all geography courses and a minimum grade point average of C in all CU work as well as in the major. No pass/fail grades in geography courses can be counted toward the 37 hours of geography, except for mandatory pass/fail grades in approved Study Abroad programs. Twelve hours of upper-division geography course work for the major must be taken on the Boulder campus. No course may be used to fulfill more than one requirement for the major. “Same as” or “cross-listed” courses in other departments count for geography hours. Any credits in excess of 45 hours in Geography will not count toward the A&S 120-hour requirement.

Geography major without a specific track

- Take any upper division Human Geography class
- Take electives within Geography to reach 37 total and 23 upper division credits in Geography.



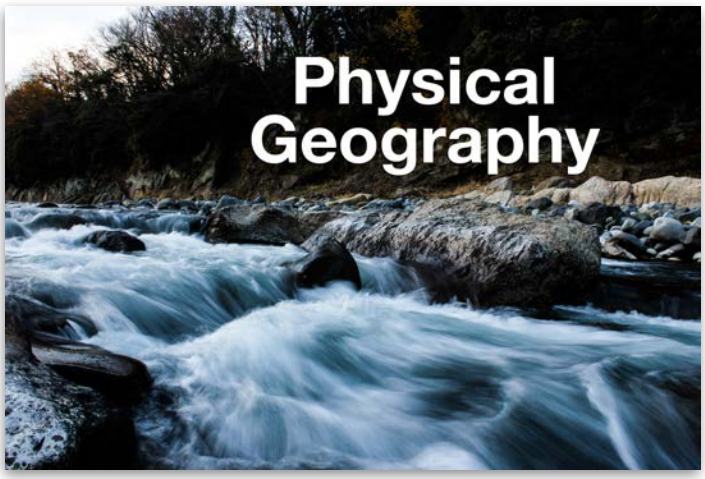
Optional Major Tracks

You may choose to concentrate your studies in one of four optional tracks:

- Physical Geography
- Human Geography
- Environment-Society Relations
- Geographic Information Science

Physical Geography Track

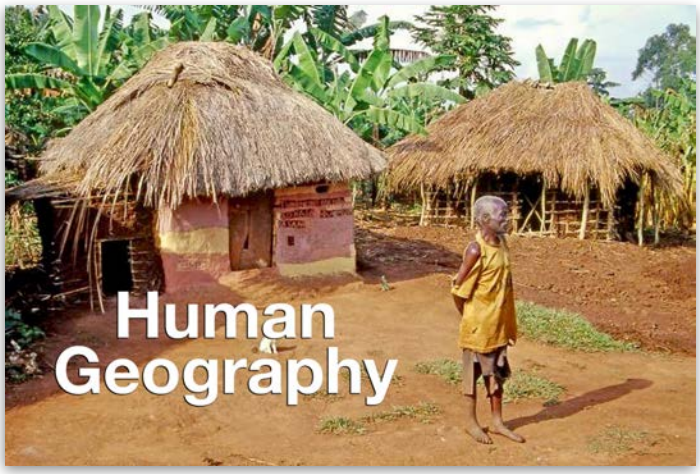
Physical geography integrates the study of landforms, water, soils, climate, and vegetation as inter-related, major natural elements of the environment. The focus of physical geography is on the zone of the land, ocean, and atmosphere containing most of the world's organic life. Physical geography not only describes natural phenomena near the surface of the earth but, more importantly, seeks explanations of how and why the physical and biological processes act as they do. Physical geography includes processes studied in other physical and natural sciences such as meteorology, geology, biology, and soil science, however, physical geography is more than a mere composite of these other sciences. It takes a comprehensive approach to the processes of the natural environment, often with an emphasis on human modifications to the environment.



Physical Geography Track Requirements

- Take Calculus 1 & 2 (one of the following sequences)
  - MATH 1300 (5) and MATH 2300
  - APPM 1350 (4) and APPM 1360
- Take three semesters (total) of Physics and Chemistry, including related labs.
  - PHYS 1110 (4)
  - PHYS 1120 (5) (and PHYS 1140 lab)
  - CHEM 1113 (5) (and CHEM 1114 lab)
  - CHEM 1133 (5) (and CHEM 1134 lab)
- Take two of the following (GEOG 1001 and GEOG 1011, or equivalent, required for all 3000 and 4000 level courses):
  - GEOG 3351 (3) Biogeography
  - GEOG 3511 (4) Introduction to Hydrology
  - GEOG 3601 (3) Principles of Climate
  - GEOG 4241 (4) Principles of Geomorphology
- Take two electives from the following list (GEOG 1001 and GEOG 1011, or equivalent, required for all 3000 and 4000 level courses):
  - GEOG 3251 (3) Mountain Geography
  - GEOG 3301 (3) Analysis of Climate
  - GEOG 3351 (3) Biogeography
  - GEOG 3511 (4) Introduction to Hydrology
  - GEOG 3601 (3) Principles of Climate
  - GEOG 4201 (3) Biometeorology
  - GEOG 4241 (4) Principles of Geomorphology
  - GEOG 4251 (4) Fluvial Geomorphology
  - GEOG 4261 (3) Glaciers and Permafrost
  - GEOG 4271 (3) Arctic Climate System
  - GEOG 4321 (3-4) Snow Hydrology
  - GEOG 4331 (3-4) Mountain Climatology
  - GEOG 4371 (3) Forest Geography
  - GEOG 4401 (3) Soils Geography
  - GEOG 3930 (3) Internship and GEOG 4990 (3) Senior Thesis may be applied to the concentration on a case-by-case basis.
- Take one upper division elective in Geographic Information Science, Environment-Society Relations, or Human Geography

Human Geography Track



Human geography is the study of all aspects of the relationship between societies and space – how regions are formed; how landscapes are culturally produced and come to be associated with certain memories and ideas; what globalization is and why it matters; and how places come to be as they are. It also includes the spatial patterns of everything from urbanization to disease burdens and wars around the world. The human geography track allows you to study indigenous struggles over human rights, global public health, migration and immigration, gender in the global economy, security and humanitarianism, racial segregation, the politics of identity, and how to better measure and understand urban neighborhoods, among other subjects. We have a particular strength on international development, including coursework on China, Africa, Latin America, and South Asia.

Human Geography Track Requirements

- Take one of the following (unless noted, the recommended prereq for upper-division human geography courses is 1962, 1972, 1982, 1992, or 2092):
  - GEOG 3742 (3) Place, Power, Contemporary Culture
  - GEOG 3682 (3) Geography of International Development
- A third-year university-level proficiency in a foreign language appropriate to the geographic concentration is required. This requirement may be met by completion of one or two semester-long, third year, university-level grammar courses (depending on the language) with a grade of C- or better, while also satisfying language department requirements for advancement through the sequence.
- Take three electives from the following list:
  - GEOG 3422 (3) Political Ecology (no prereq)
  - GEOG 3612 (3) Geography of American Cities
  - GEOG 3672 (3) Gender and the Global Economy
  - GEOG 3682 (3) Geography of International Development (no prereq)
  - GEOG 3692 (3) Introduction to Global Public Health
  - GEOG 3742 (3) Place, Power, and Contemporary Culture
  - GEOG 3812 (3) Geography of Mexico, Central America, and the Caribbean
  - GEOG 3822 (3) Geography of China
  - GEOG 3832 (3) Geography of South Asia
  - GEOG 3862 (3) Geography of Africa
  - GEOG 4173 (3) Research Seminar

- GEOG 4292 (3) Migration, Urbanization, and Development
- GEOG 4622 (3) City Life
- GEOG 4632 (3) Development Geography
- GEOG 4712 (3) Political Geography
- GEOG 4732 (3) Population Geography
- GEOG 4852 (3) Health and Medical Geography
- GEOG 3930 (3) Internship and GEOG 4990 (3) Senior Thesis may be applied to the concentration on a case-by-case basis.

- Take one upper division elective in Geographic Information Science, Environment-Society Relations, or Physical Geography

Environment-Society Relations Track

From its earliest development as an academic field, geography has been concerned with the manifold relations between societies and their natural and built environments. Societies adapt to and transform the environments they inhabit. They depend upon the use of resources and reduction of hazards for their survival and material well-being. They also assign meanings to the environment that vary over place and time, but that help define their identity and values within the world. Geographers tend to study these phenomena under the broad headings of political ecology, natural resource management, sustainable development, and environmental conservation. Major topical areas include global climate change, environmental conflicts, and indigenous peoples and the environment. The University of Colorado has special strength in land and water resource issues in the US West, Africa, Latin America, and Asia. Students concentrating on environment-society relations are advised to take the introductory courses in human and physical geography and then, depending upon their academic interests and aims, to concentrate on specific topics and regions in the environment-society area.

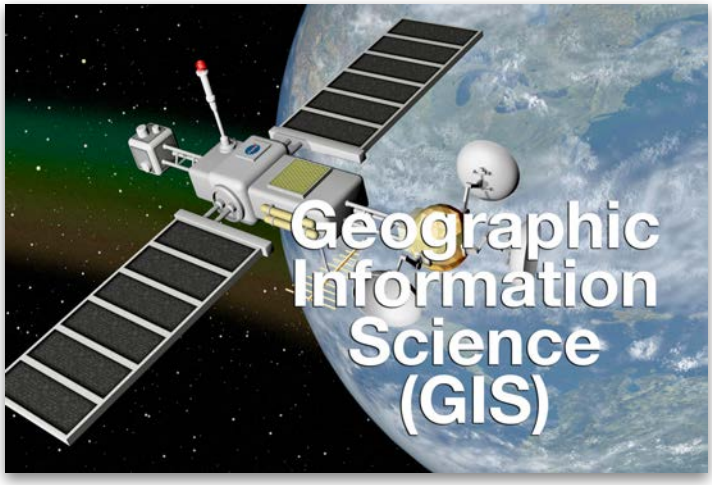
Environment-Society Relations Track Requirements

- Take one of the following:
  - GEOG 3402 (3) Natural Hazards
  - GEOG 3422 (3) Political Ecology
- Take ENVS 2000 (4): Applied Ecology
- Take three electives from the following list (unless noted, the recommended prereq for upper-division human geography courses is 1962, 1972, 1982, 1992, or 2092):

- GEOG 3402 (3) Natural Hazards
- GEOG 3422 (3) Political Ecology (no prereq)
- GEOG 3682 (3) Geography of International Development (no prereq)
- GEOG 3672 (3) Gender and the Global Economy
- GEOG 3692 (3) Introduction to Global Public Health
- GEOG 3812 (3) Geography of Mexico, Central America, and the Caribbean
- GEOG 3822 (3) Geography of China
- GEOG 3862 (3) Geography of Africa
- GEOG 4173 (3) Research Seminar
- GEOG 4501 (3) Water Resources and Water Management in the Western US
- GEOG 4742 (3) Topics in Environment and Society
- GEOG 4812 (3) Environment and Development in South America
- GEOG 4822 (3) Environment and Development in China
- GEOG 3930 (3) Internship and GEOG 4990 (3) Senior Thesis may be applied to the concentration on a case-by-case basis.

• Take one upper division elective from either the Geographic Information Science, Human Geography, or Physical Geography list.

Geographic Information Science Track



Geographers have an ongoing concern with the acquisition, manipulation, and representation of spatial data. The widespread adoption of digital technology coupled with management of very large spatial data sets has led to the development of Geographic Information Science. Particularly with respect to digital information, the nature of geographical data that vary with scale, time, and spectral characteristics presents unique problems for geographers and environmental scientists. In our world of massive amounts of information, geographers use remote sensing methods for collecting and integrating geographical data. They utilize cartography and geographic information systems to uncover spatial patterns and trends, to reconstruct past environmental conditions and to predict future scenarios. The use of such methods requires expertise not covered in human and physical geography concentrations. Conceptually, the societal, political and ethical implications of geographic information in policy and decision-making are only beginning to be understood; this forms an important component of study in geographic information science.

Cartography: the representation of geographical data in map form along with the methods for measuring such data on maps. Such cartographic products may be produced, transformed and analyzed by manual or automated methods. Cartography also includes an understanding of the perceptual and cognitive aspects of map communication. Additional emphasis is placed on the role that statistical analysis plays in protecting against the introduction of error and bias into map displays.

Geographic Information Systems: the construction and use of an information system and its data specifically designed for representing and manipulating geographical data. Modern geographic information systems include computer hardware/software with a collection of methods/procedures for recording, transforming, storing/retrieving, analyzing, and mapping geographic data. Coursework balances material on the mechanics of information systems with concepts underlying GIS database organization with use of information systems to build and interpret geographic modeling applications.

Remote Sensing: the science of collecting and analyzing information about phenomena using sensing devices that are not in contact with (i.e., are remote) the phenomena under study. In the geography curriculum, the phenomena under study are earth resources (e.g., vegetation, land use/cover) and the sensing devices include optical (i.e., cameras) and electronic sensors recording imagery in visible and non-visible wavelengths. Analysis of such imagery is aided by automated image processing.

GIS Track Requirements

- GEOG 4103 (4) Intro to Geographic Information Science (prereq GEOG 3023 (4) and GEOG 3053 (4))
- Take three electives from the following list:
  - GEOG 4093 (4) Remote Sensing of the Environment
  - GEOG 4003 (4) Topics in Geographic Skills: Advanced Remote Sensing
  - GEOG 4203 (4) Geographic Information Science: Modeling Applications
  - GEOG 4303 (4) GIS Programming for Spatial Analysis
  - GEOG 4403 (3) Space Time Analytics
  - GEOG 4503 (3) GIS and Geospatial Project Management
  - GEOG 3930 (3) Internship and GEOG 4990 (3) Senior Thesis may be applied to the concentration on a case-by-case basis.
- Take one upper division elective from either the Human Geography, Environment-Society Relations, or Physical Geography list.

GEOGRAPHY

Caution: This guide supplements, but does not supersede, the most recent University of Colorado, Boulder Catalog. General College and University degree requirements are given in the Catalog.

Contact Information:

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Additional information and handouts about the minor, certificates, honors, internships, independent study, career planning and graduate school are available both in the Geography office in Guggenheim and the Advising Center for Excellence in the Environmental Design (ENVD) building.

Geography Faculty Members and their Specializations

WALEED ABDALADI waleed.abdalati@colorado.edu	remote sensing of Earth's ice cover
SUZANNE ANDERSON suzanne.anderson@colorado.edu	geomorphology; weathering; hydrology; glaciology
JENNIFER K. BALCH jennifer.balch@colorado.edu	fire ecology, land use/landcover change, global change ecology, tropical forest ecology
HOLLY BARNARD holly.barnard@colorado.edu	ecohydrology, stable isotope geochemistry, forest hydrology, tree physiology
PETER D. BLANKEN blanken@colorado.edu	climatology, biometeorology
JOE BRYAN jbryan@colorado.edu	indigenous politics in the Americas, human rights, critical cartography
BARBARA P. BUTTENFIELD babs@colorado.edu	GIS, cartographic generalization, multi-scale databases
MIKE DWYER mike.dwyer@colorado.edu	Development studies; political ecology; land governance; Southeast Asia
CARSON FARMER carson.farmer@colorado.edu	spatial-temporal dynamics, computational GIScience, spatial interactions, transportation
JENNIFER FLURI jennifer.fluri@colorado.edu	feminist political geography, conflict security and development, South/Southwest Asia
MARA GOLDMAN mara.goldman@colorado.edu	political ecology; science and technology studies; indigenous knowledge; nature-society relations
SARAH KELLY sarah.kelly@colorado.edu	GIScience, statistics, spatial epidemiology, ecological restoration
STEFAN LEYK stefan.leyk@colorado.edu	GIScience, uncertainty modeling, small area estimation, cartographic pattern recognition
KATHERINE LININGER katherine.lininger@colorado.edu	fluvial geomorphology; ecogeomorphology; carbon cycle; water resources management; coupled natural-human systems
NOAH MOLOTCH noah.molotch@colorado.edu	surface water and snow hydrology, remote sensing, ecohydrology
TIMOTHY OAKES timothy.oakes@colorado.edu	cultural politics, economic and social change, China
JOHN V. O'LOUGHLIN johno@colorado.edu	political, former Soviet Union, post communist societies, nationalism
COLLEEN REID colleen.reid@colorado.edu	climate change and human health; environmental and social epidemiology; spatial exposure assessment
FERNANDO RIOSMENA fernando.riosmena @colorado.edu	international migration, the informal economy and population dynamics, social demography, Latin America
MARK SERREZE mark.serreze@colorado.edu	Arctic climate; global implications; and climate warming in the Arctic
SETH SPIELMAN seth.spielman@colorado.edu	urban geography, medical geography, spatial statistics, GIScience
WILLIAM R. TRAVIS william.travis@colorado.edu	natural hazards, risk, climate change, decision-making
YAFFA TRUELOVE yaffa.truelove@colorado.edu	urban geography, political ecology of water, India, southern urbanism, urban infrastructure, water governance, nature-society relations
THOMAS T. VEBLEN thomas.veblen@colorado.edu	biogeography, conservation
EMILY YEH emily.yeh@colorado.edu	nature/society geography; political ecology; cultural politics; development; Tibet; China