BACKGROUND

Wilderness medicine is defined by the practice of medicine in resource-limited, austere environments. The Section of Wilderness and Environmental Medicine at the University of Colorado School of Medicine’s Department of Emergency Medicine is a university-based enterprise to promote research, best practice, education, and outreach to advance health and wellness in extreme environments. Our work includes attention to the greater policy issues of environmental change in health, and we are committed toward advancing the conversation based upon the best scientific evidence to improve discourse and understanding. Our constituents are the community and students of the health sciences in all levels, including seasoned medical practitioners seeking to augment their skill sets. We have robust collaborations with different organizations in order to bring forth diversity of experiences and perspectives in our mission to advance the field of wilderness and environmental medicine. Our goal is to have the most comprehensive program of its kind in the world, setting the standard of excellence in scholarship in our field.

OBJECTIVES

Wilderness medicine is defined by the practice of medicine in resource-limited, austere environments—not exclusively by distance from human population centers. The skills taught by our fellowship have broad and unique applications: in wilderness areas, pre-hospital care, disaster medicine, travel medicine, international and developing-world projects, and environmental/medical policy. The critical cognitive knowledge and skills taught by our fellowship are imparted through a range of organized didactic, research, and clinical experiences.

GOALS

The University of Colorado Wilderness Medicine Fellowship is a 15-month graduate medical education program designed to train fellows in advanced wilderness medicine concepts, provide field and remote rescue skills, and to provide research skills necessary to become an academic clinician with a specialty in wilderness and austere medicine. The fellow will fulfill these goals via: (1) a clinical appointment at the University of Colorado Medical Center; (2) a faculty appointment at the University of Colorado School of Medicine as an Instructor in the Department of Emergency Medicine; (3) domestic and international research and academic scholarly projects; (4) becoming an expert in at least one wilderness technical skill, and (5) completion of the University of Colorado Wilderness Medicine Fellowship Curriculum.

FELLOWSHIP REQUIREMENTS

The fellowship requires a 15-month commitment. Eligible candidates for the fellowship program must have completed an ACGME accredited residency program in emergency medicine. Candidates must be board-eligible or board-certified and must have at least two letters of reference attesting to their clinical and academic capabilities.
The fellowship program will consist of the following components:

**CLINICAL EXPERIENCE**
A firm clinical grounding in the practice of emergency medicine is foremost in the skill set of an effective wilderness medicine practitioner. Our experience shows that independent practice of patient care in a carefully mentored environment allows rapid further advance of young clinicians, while encouraging the independence required for effective emergency and wilderness medical care.

- **Clinical Appointment:** The fellowship will consist of a clinical appointment at the University of Colorado Medical Center in a total of 10 clinical shifts per month for 12 months (no more than 16 hours a week), with 3 months of time protected from clinical duties, salary to be paid over 15 months. Moonlighting is permitted at UCH, Denver Health, and the VA Hospital only.

- **Wilderness/Developing World Clinical Care:** Fellows are expected to spend at least one to three months actively participating in wilderness/developing world clinical care. Given the unique requirements of distance from population centers, the fellow’s clinical practice of wilderness medicine may occur in settings removed from on-scene oversight by Fellowship staff. While distant-based precepting of fellows is an imperfect system, each of our potential field experiences occurs in settings well-known to Fellowship staff, with local, real-time oversight available by US Board Certified physicians who are also well-known. Detailed pre-departure review of expected pathophysiology and management plans maximizes fellows’ learning opportunities. Prior Wilderness Medicine fellows in other programs have engaged in leadership/field medical staff position opportunities with:
  - The London School of Tropical Medicine and Hygiene Diploma masters in Travel Medicine
  - The Himalayan Rescue Association (HRA) -- Pheriche, Nepal – caring for both local and trekking/climbing populations in the Khumbu Valley, Nepal (below Everest Base Camp). Our fellowship has a long association with the leadership of the HRA. This clinic continues to be the site of groundbreaking high altitude research.
  - Explorers’ Club—caring for expedition members on international journeys.
  - U.S. Army Research Institute for Environmental Medicine – Pikes Peak Labs in Colorado.

*Additional opportunities exist for extended experience through:*
  - Gokyo Porters’ Clinic (Khumbu, Nepal)
  - Denali high altitude backcountry patrols (U.S. Park Service)
  - Gorgas School for Tropical Medicine (Peru)
  - US Antarctic Program
  - Event/Festival medical services at local/regional Colorado events
LEADERSHIP & TEACHING SKILLS

The successful practice of wilderness medicine is advanced by the study and practice of expedition and leadership practice and theory. The practice of wilderness medicine is inevitably a team exercise under trying circumstances. The ability to effectively anticipate common expedition logistics, to appreciate different learning and leadership styles, and to organize and effect group dynamics towards a unified end (whether in travel, search and rescue, or clinical care) are critical skills—and ones with direct application to ‘front-country’ medical endeavors. This longitudinal educational experience is taught through reading, discussion, and field experiential education.

- **Faculty Appointment:** The fellow will receive a faculty appointment at the University of Colorado School of Medicine (SOM) as Instructor in the Department of Emergency Medicine. Fellows have regular teaching responsibilities with the Denver Health Residency in Emergency Medicine (DHREM) and with medical students from the University of Colorado SOM. Fellows are expected to help teach the Introduction to and Advanced Wilderness Medicine courses at the SOM, and to lead the DHREM Residency WM Interest Track series through lectures or small group workshops.

  - **Faculty Expectations:**
    - Organize and run as Conference Co-Chair the mid-September Wilderness Medicine Section CME course at University of Colorado Hospital
    - Leadership of the Residency Wilderness Medicine Track including selection of articles for journal club, planning of skills/offsite activities, and giving lectures during didactics time
    - Participation in EMED 6624 (Introduction to Wilderness Medicine) and EMED 8031 (Advanced Wilderness Medicine) at the University of Colorado School of Medicine as a lecturer and small group leader
    - Participation in the DHREM didactics Environmental Emergencies Curriculum as a lecturer and/or small group leader
    - At least 50% participation at weekly Morbidity and Mortality conferences for Denver Health Residents of Emergency Medicine, and at every other week Faculty Meeting at University of Colorado Hospital

- **Field-Based Education:** Fellows are provided opportunity for teaching time in the field with the medical student elective and the undergraduate elective. Fellows also have the opportunity to teach Advanced Wilderness Life Support (AWLS). Additional opportunities for leadership/teaching for physician level CME are currently being developed. Fellows are involved in staff training for Colorado Outward Bound and are invited to participate in a Colorado Outward Bound course of their choosing during their fellowship training.

  - **Faculty Expectations:**
    - Participation in at least two of three undergraduate Emergency Medicine Wilderness Medicine backcountry courses (January, June, or August)
    - Recognizing Different Learning Styles
      - Visual, kinesthetic, aural, narrative/associative
      - Educational techniques: lecture, problem-based learning, case-based learning, seminar, small groups, field experience
    - Teaching in the Field
      - Visual presentation options
      - Key points of ideal “classroom” selection
      - When to teach: weather, time of day, goals for days travel, topography
      - Best use of “teachable moments” on the trail/river
Leadership Skills

- Pre-treat planning
- Group dynamics
- Setting realistic personal and group goals
- Expedition behavior
- Lessons in effective feedback
- Leadership styles

Wilderness Medicine Fellowship Teaching Modules

The University of Colorado Wilderness Medicine Fellowship Curriculum is established based on thirteen discrete areas of wilderness medical expertise. These modules allow fellows to master the breadth and depth of cognitive knowledge required to competently practice wilderness medicine. These modules will consist of a monthly seminar designed to cover the entire curriculum of wilderness medicine in a small group, evidence-based format. The thirteen modules are listed here:

i. Altitude Medicine I - Epidemiology, Treatment of AMS, HACE
ii. Altitude Medicine II - Pathophysiology, HAPE
iii. Hypothermia
iv. Frostbite
v. Travel Medicine/Fever in the Returning Traveler
vi. Heat Illness; Lightning
vii. Submersion Injuries; Dive Medicine
viii. Expedition Medicine
ix. Climate Change/Environmental Health
x. Search and Rescue
xi. Animal Envenomations/Attacks/Bites/Stings
xii. Avalanches
xiii. Poisonous Plants/Toxinology

Research Skills & Opportunities

It is expected that all Wilderness Medicine fellows will actively pursue research as a key focus of their fellowship. The goal of this component is to teach and review topics and skills required for a successful research career. Rather than a listing of individual, important skills, we teach research skills as a narrative process. While individual scientific papers might appear as isolated objects, each is the product of a human narrative—from first inklings of an idea to a final published work.

Regular and direct contact with the Fellowship Directors allows planning and oversight of fellow’s individual research projects. Fellows are encouraged to pursue their specific interests in developing projects that will be rewarding in the immediate term, and that will prepare them for a career as leaders in academic wilderness medicine.

- **Research Expectations:** Fellows are expected to submit:
  - One lecture proposal to the Wilderness Medical Society (WMS) for presentation at a conference.
  - One scholarly/academic research project ready to be published.
A review of two to three articles for the *Journal of Wilderness and Environmental Medicine*

A minimum of two but as many as desired contributions to the University of Colorado Wilderness Medicine Section blog: [http://ColoradoWM.org/blog](http://ColoradoWM.org/blog)

- **Research Skills:** These research skills will be taught through a University of Colorado Fellowship Research Seminar, to be taught by senior research faculty within the department, and combined with fellows from Ultrasound, EMS, Toxicology, and Administration. Topics include:
  1. Finding Your Niche in Wilderness Medicine
  2. Research Planning
  3. Statistics
  4. IRB's Navigation
  5. Measurement Forms/ Field Devices
  6. Analysis of Data
  7. Choosing Prospective Journals for Submission.
  8. Writing the Paper
  9. Responding to Peer-Reviewers

- **Research Opportunities:** There are numerous research opportunities within the department as well as with faculty throughout the University of Colorado. Current, active collaborations include projects with:
  - Center for Altitude Research at the University of Colorado
  - Research investigators at the US Army Research Institute for Environmental Medicine (USARIEM) Pikes Peak Lab
  - Investigators with the Himalayan Rescue Association (HRA)
  - Faculty of University of Colorado School of Medicine
  - WMI/NOLS on educational outcomes for wilderness medicine courses

**WILDERNESS TECHNICAL SKILLS**

Wilderness medicine is defined as the practice of medicine in resource limited, austere environments. Safely practicing medicine under austere conditions requires a discrete and teachable body of expertise—including skills of keeping oneself and one’s patients physically comfortable in any of a range of demanding climates; the ability to safely acquire food, water, and dispose of human waste in any of a variety of biomes; and technical wilderness travel skills including navigation and safe travel in environments not limited to those involving the hazards of high altitude, high angles, moving water, and extremes of temperature. These skills are taught through seminar and by field experience under direct supervision. The fellow must demonstrate competence in performance and supervision of at least one area of technical outdoor skills:

- ice climbing
- rock climbing
- whitewater canoe/kayaking
- mountaineering
- mountain biking
- sea kayaking
- SCUBA diving
OUTCOMES

Effective practice of wilderness medicine requires mastery of a large, discrete body of cognitive knowledge, and by the completion of the fellowship, the fellow will be a leader in the emerging field of wilderness medicine. The fellow will have completed clinical hours under the supervision of mentors, research projects, publications, education towards an advanced degree, expertise in at least one wilderness technical skill, as well as faculty, teaching, and leadership experience.

WILDERNESS FELLOWSHIP WILL INCLUDE:

- GME PGY stipend levels salary
- $5,000 stipend to use towards research project or advanced degree
- Up to $1,300 travel allowance for one scientific or educational presentation at a national meeting
- Faculty mentorship

HOW TO APPLY

Interested candidates should submit all inquiries and a current CV, a letter of interest or personal statement, and at least two letters of reference attesting to their clinical and academic capabilities to the University of Colorado School of Medicine at cowilderness@ucdenver.edu.

DEADLINE FOR APPLICATIONS IS OCTOBER 1ST.