

## Part 1: SABBATICAL PLAN

*Board of Regents and CU System policies require the following information be provided by each faculty member applying for a sabbatical assignment. Thank you for completing this public document in a clear and substantive way. Each response should be a minimum of 300 words.*

Applicant Name: \_\_\_\_\_

Title of Sabbatical Project: Physical and ecological insights into floodplain processes: wood, vegetation, and sediment interaction

(1) Describe your sabbatical's academic objectives including its contribution to your professional growth and expertise.

I am a fluvial geomorphologist and river scientist, focusing on the interaction between geomorphic (physical) processes and ecological processes in rivers and floodplains. Rivers integrate the landscape, carrying and depositing water, sediment, wood, carbon, and nutrients from their watershed. My research interests include the influence of river and floodplain processes on the transport and storage of organic carbon in floodplain soil and downed wood; interactions between wood, vegetation, and geomorphic processes; how beavers modify fluxes of sediment and carbon; and research on human impacts to riverscapes.

During my sabbatical, I plan to investigate the interactions among floodplain vegetation, downed wood, water flows, and sediment fluxes to better understand and predict changes in floodplains over time. Floodplains provide many ecosystem services, including supporting productive forests, providing habitat, dissipating floods to reduce downstream flooding hazards, and storing significant amounts of carbon relative to their area. Physically complex (i.e., spatially heterogeneous) floodplains can increase resilience to disturbances such as floods and fires. Coupled ecological-geomorphic processes (i.e., the interactions between vegetation, downed wood, and water and sediment fluxes) support and increase floodplain physical complexity. Despite the importance of floodplain ecosystem services, humans have significantly altered floodplains through levee construction, land use change and logging, dams, and flow alterations. Recent and increasing emphasis on restoring and managing floodplains indicates that we need to better understand coupled ecological-geomorphic processes in floodplains to inform restoration approaches and better predict the impact of river management decisions.

My sabbatical project will expand understanding of floodplains through fieldwork and numerical modeling. Not only is this research important for better understanding the linked ecological and geomorphic processes that create floodplains, but also to emphasize the vital importance of floodplains in mitigating future risks (e.g., altered flood regimes, habitat loss) and as hotspots of carbon storage under warming climate conditions. I will conduct field investigations and geospatial analyses of floodplain wood, vegetation, and topography on the Tagliamento River in northeastern Italy. The Tagliamento is one of the few large and still relatively natural rivers in Europe, making it an important field location to study unaltered floodplain processes. During my sabbatical, I will collaborate with researchers at the University of Trento, Italy and the University of Bern, Switzerland to apply ecomorphodynamic (i.e., ecological-morphological) numerical modeling techniques to better understand the interactions between wood, vegetation growth, and geomorphic processes in floodplains. Numerical modeling can provide insight into floodplain development over time, the impact of human activities on floodplain form and process, and the outcomes of river corridor restoration and management decisions.

In my research, I have contributed to understanding of floodplain and river processes using data from field observations, geospatial analyses, and statistical and physical modeling. However, my experience with numerical modeling is limited compared to the other methods that I employ. Because my sabbatical project will emphasize numerical modeling, it will significantly benefit my future career trajectory by allowing me to develop modeling techniques that I can apply in a wide variety of contexts. During my sabbatical project, I will also develop new collaborations and extend my research network, which will benefit CU-Boulder and my graduate students.



(2) Describe your work plan including all anticipated professional activities (i.e., where will you spend your sabbatical, what you will do, your work timeline, etc.).

To better understand interactions between flow, sediment, wood, and vegetation in floodplains, I plan to complete the following research objectives during my sabbatical, in collaboration with researchers at the University of Trento, Italy and University of Bern, Switzerland: 1) quantify the spatial distribution of wood deposited on the floodplain of the Tagliamento River and correlate wood presence and amounts with variations in vegetation cover, vegetation type, and small-scale topographic variation; 2) collect field data (e.g., floodplain sediment samples, wood accumulation data, and tree characteristics (species, forest density)) needed to calibrate and validate ecomorphodynamic models for floodplain environments; and 3) apply ecomorphodynamic numerical models in floodplain environments.

In Fall 2025, I will complete geospatial analyses of the Tagliamento River to plan fieldwork activities, which will occur in early Spring 2026. These geospatial analyses will include assessing historical and current imagery and topographic data (digital elevation models) to understand the Tagliamento floodplain and begin mapping potential field locations. In addition to geospatial analyses, in Fall 2025 I will develop different ecomorphodynamic modelling approaches in collaboration with scientists at the University of Trento. I will meet with collaborators monthly via Zoom to discuss progress through the Fall 2025 semester. In Spring 2026, I will travel to the University of Trento to meet collaborators in person. I have applied for a Fulbright Scholar Award, and I plan to apply to the Swiss National Science Foundation. Pending the outcome of these proposals, I will spend multiple months in Italy and Switzerland in Spring 2026. A portion of this time will be used for conducting fieldwork on the Tagliamento River. I will use the field data that I collect to calibrate and assess the numerical models. I will then use these models to predict how vegetation and wood influence floodplain development and form. I plan to publish at least two journal articles from this sabbatical work, as well as present at multiple international conferences.

(3) Describe how meeting your sabbatical objectives will benefit the academic, clinical, and/or pedagogical goals of your primary unit.

The project that I will complete during my sabbatical is interdisciplinary, linking physical (geomorphic) and ecological processes to better understand floodplain environments. The goal is to increase interdisciplinary understanding of environmental processes in floodplains, assessing the interactions and feedbacks between vegetation, wood, sediment transport, and water flows. This project aligns with the goals of the [REDACTED], which encourages interdisciplinary work. The [REDACTED] encourages international collaborations and expanding our research networks, and my sabbatical project will result in collaborations with researchers in Italy and Switzerland. In addition, my sabbatical project will inform floodplain management and river restoration aimed at promoting ecosystem services, such as reducing flooding hazards, providing habitat for biota, and storing carbon on the landscape. Understanding the impacts of management decisions requires an ability to predict ecological and physical processes, and my project will enhance the modeling and prediction of these ecogeomorphic processes. Thus, the broader impacts of my sabbatical project support the [REDACTED] emphasis on bridging the physical and human sciences through its importance to river management.

In addition, the [REDACTED] promotes and encourages developing hand-on teaching activities and field experiences for students. My sabbatical project will help me develop numerical modeling lab activities in the courses that I teach, which include introductory [REDACTED] courses for undergraduates, upper-level undergraduate courses, and graduate courses. As a department, we have participated in multiple teaching workshops, including workshops aimed at promoting inclusive teaching practices and promoting experiential, project-based learning. The research methods I will learn during my sabbatical, as well as the experience I will gain from guest lecturing in courses in Italy and Switzerland, will help me continue to be an effective and inclusive teacher. I will also gain experience interacting with the graduate students of my collaborators, providing the opportunity to learn more about how to advise graduate students from different backgrounds and primary languages.



[REDACTED]

(4) Describe how your sabbatical project will enhance the university's reputation.

My sabbatical project will enhance the university's reputation through creating positive and fruitful collaborations with multiple well-regarded research groups in Europe, including at the University of Trento in Italy and the University of Bern in Switzerland. Since beginning my position at CU Boulder, I have established a growing and vibrant research program, as evidenced by my publication record, external funding, and awards. Collaborating with European researchers will further expand my research network, increasing the impact of my research internationally. In addition, my sabbatical plan will result in significant and impactful advancements in our understanding of riverscapes and floodplain processes. We currently lack understanding of how ecological and geomorphic processes in rivers and floodplains influence their form and functioning. The fundamental insights into interdisciplinary understanding of river and floodplain processes that will result from my sabbatical project will fill a knowledge gap within the field of fluvial geomorphology and river science, promoting the research reputation of CU Boulder. The findings from my sabbatical project will result in at least two journal publications. I will also present the findings from my sabbatical project at multiple international research conferences, including at the [REDACTED] [REDACTED] further highlighting research conducted by CU Boulder scientists.

After the completion of my project, I will conduct outreach to river managers who are interested in understanding how wood, vegetation, and sediment fluxes promote habitat and floodplain ecosystem services, such as storing carbon and reducing flood hazards. I have extensive experience presenting at management-oriented conferences (e.g., Sustaining Colorado Watersheds and other conferences focusing on river restoration and its impacts). I also commonly communicate and interact with government agencies, non-profits, and consultants who work on river restoration. I will continue to make these connections and presentations with the results of my sabbatical project, enhancing CU Boulder's reputation in communities outside of academia.

(5) Describe how your sabbatical will contribute to the educational experience of students.

My sabbatical project will benefit my teaching and contribute to the educational experience of students at CU Boulder. After completing the project, I will incorporate interdisciplinary numerical modeling approaches as activities within the laboratory portions of my courses, for example in [REDACTED]

[REDACTED] These activities will use the datasets that I will collect during my sabbatical in numerical modeling exercises. The exercises will demonstrate that both vegetation and physical processes of sedimentation and water flows influence the form of channels and their floodplains. The exercises will also teach students quantitative skills, enhance their understanding of coding and coding languages, and promote conceptual understanding of complicated processes in floodplain environments. I will also be able to incorporate more examples of different riverine environments into my courses after the completion of my sabbatical, including when I teach [REDACTED], which is a large introductory [REDACTED] course. Including examples from rivers in Europe will provide a unique and different perspective for students. During my sabbatical, I plan to give guest lectures in courses run by my collaborators at the University of Trento and the University of Bern. Through these activities, I will gain experience teaching students from different backgrounds and primary languages, which will help me think critically about how to ensure that my teaching is inclusive. I plan to interact with graduate students within the research groups of my collaborators, and my CU Boulder graduate students will benefit from my seeing different advising approaches in different countries. My sabbatical project will not only benefit CU Boulder students, but also contribute to the education of students within the research groups of my collaborators and the students who I will interact with through guest lectures at the University of Trento and University of Bern.



## Part 2:

### REMUNERATION AND FUNDING PLAN

*Regarding external funding, faculty members applying for sabbatical assignments are expected to apply for external funding (such as fellowships, grants, or clinical work) when appropriate. The total university salary to the faculty member, from sabbatical pay and any contract or grant administered through the university, shall not exceed university limits. There is no restriction on additional non-university income, subject to the faculty member satisfying the duties of the sabbatical plan and any contract/grant requirements. If a faculty member on sabbatical anticipates funding, sponsorship, employment, gifts, non-financial support, or other benefits from foreign institutions or sources, these should be detailed in the sabbatical remuneration plan, and all appropriate Export Control procedures should be followed. In addition, faculty members on sabbatical leave are not permitted to be paid for any administrative appointments or extra teaching during the sabbatical period.*

- (6) Per CU System APS 1024, it is expected that faculty members applying for sabbatical will also apply for **external** funding to the extent it is available. Describe any anticipated external funding sources, amount of funding from sources external to CU, and attempts to obtain such funding.

To support my sabbatical activities, I have applied for a Fulbright Scholar Award, the "Fulbright Early Career Research Lectureship at the Department of Civil, Environmental and Mechanical Engineering at the University of Trento". This award would provide a cost-of-living stipend and travel expenses for interacting and collaborating with researchers at the University of Trento. Because my sabbatical plan also includes collaboration with researchers at the University of Bern, Switzerland, I am also planning to apply to the Swiss National Science Foundation. This award, if funded, would provide a cost-of-living allowance, travel funding, and support for fieldwork activities. I plan to submit the proposal to the Swiss National Science Foundation in November 2024. In addition to these awards, I will investigate additional funding opportunities over the next year prior to the beginning of my sabbatical. I also have multiple ongoing National Science Foundation grants that are related to my sabbatical activities [REDACTED]

- (7) Describe the source and amount of any additional funding to support your sabbatical, including departmental or gift funding.

I do not have additional funding to support my sabbatical beyond the external funding support described in the previous question, which includes my applications for a Fulbright Scholar Award and support from the Swiss National Science, as well as ongoing National Science Foundation grants. However, I will investigate additional funding opportunities prior to the start of my sabbatical.

- (8) Describe any anticipated support from foreign or international entities, including research collaborators, host universities, or other institutions, (e.g., equipment use, office/lab space, lodging or travel).

When visiting Italy and Switzerland for fieldwork and project visits, my European collaborators at the University of Trento and University of Bern will provide me with office space, laboratory space to analyze field samples, and field research gear. They will also provide logistical support and advice for fieldwork activities.

- (9) Under the University's [APS 1024](#), faculty must identify business expenses to be reimbursed in connection with a Sabbatical Plan. Please describe anticipated business expenses and the funding source for those expenses.

Anticipated business expenses include travel costs to and from Europe and some travel (train and plane) between Switzerland and Italy to meet with collaborators. In addition, there will be travel costs to complete planned fieldwork. I will also have housing costs when in Switzerland and Italy. Funding sources for these costs include pending funding through the Fulbright Scholar Award and the Swiss National Science Foundation. In addition, I have multiple ongoing National Science Foundation grants that could support some of these business expenses, since my sabbatical project relates to my ongoing research.

- (10) Will this plan require international travel? If so, please describe the travel including anticipated destination(s).

Yes, this plan will require international travel, including to Trento, Italy and Bern, Switzerland. In addition, I will conduct field work on sites along the Tagliamento River in northern Italy. In Spring 2025, I plan to travel to Trento, Italy, fieldwork sites on the Tagliamento River in Italy, and Bern, Switzerland.

**Part 3:**  
**DEPARTMENT CHAIR/UNIT HEAD**  
**PLAN FOR COVERAGE AND REMUNERATION**

*Based on the corresponding CU System [APS 1024](#), the dean of the school/college shall ensure that the costs associated with the sabbatical are covered, including teaching replacement expenses. The dean may suspend a sabbatical if funding is not available in the school/college. Remuneration (from university resources such as state funding, university administered grants or contracts, or any other university managed sources) for the sabbatical assignment shall be as follows: for full-time faculty on nine-month appointments, either full salary for one semester or half salary for two semesters; for full-time faculty on 12-month appointments, six months full salary or 12 months half salary. Please note that remuneration from university-managed funds or university-administered grants or contracts should not exceed 100% of the faculty member's base salary in the case of full-pay sabbaticals, or 50% in the case of half-pay sabbaticals. For two-semester sabbaticals, remuneration sourced from General Funds (Fund 10) should not be used to supplement a half-salary. Stipends for administrative duties, such as chair or center director stipends, are not included in "base salary" and shall not be taken into account in calculating the individual's salary while on sabbatical.*

- (11) Describe the plan for coverage of the faculty member's teaching responsibilities and replacement of teaching expenses. If it is known at the time this application is being made, include specific course names or numbers to be replaced each semester.

teaching responsibilities will be covered by hiring a lecturer to cover her courses with the leaves and replacement funds provided by the College of Arts and Sciences.

- (12) If the applicant is in an additional administrative position (e.g., chair or director), indicate how the administrative responsibilities will be covered.

N/A