I-WATER - Organizing Concept, Interdisciplinary Research Goals and Themes

Because water management decisions generate conflicts between humans, ecosystem needs, and political jurisdictions, there is a critical need for scientists who can manage water resources responsibly. Uncertainty of water availability causes managers to store and redistribute water to control risk, while climate variability exacerbates uncertainty. Therefore, three important questions must be answered:

- How can limited fresh water be distributed equitably in a socially acceptable and sustainable framework?
- What are the relative hydro-climatic, ecological, and societal benefits and drawbacks of management actions? And
- How can science provide answers for wise water management decisions?

I-WATER addresses these challenges by training Ph.D. students to conduct complex, interdisciplinary research at the interfaces\(^1\) between hydrologic, atmospheric, ecologic, and management disciplines. Issues of variability and uncertainty, vulnerability of human use and ecosystems, and sustainability are probed in the framework of the following research themes:

- Research Theme I: Hydrologic, atmospheric, and ecologic systems;
- Research Theme II: Hydrologic, ecologic, and socio-economic systems;
- Research Theme III: Hydrologic, atmospheric, and socio-economic systems; and
- Research Theme IV: I-WATER Research integration and synthesis.

I-WATER involves 11 science and engineering departments at Colorado State University, and includes opportunities for trainees to participate in internships at federal and state agencies.

The organizing concept of I-WATER is shown in the diagram illustrating an integrative approach to problems in hydrologic science, land-surface atmosphere interactions, climate science, ecosystems science, vulnerability assessment, water resources management and policy-making. I-WATER emphasizes research to increase our understanding of how the interactions between the indicated elements of Earth’s bio-physical climate system are modified by and modify eco-hydrological systems, as well as how they are affected by human intervention and by climatic variability and change.

\(^1\) Interfaces I, II, and III are indicated in the diagram by the blue roman numerals. Research Theme IV is indicated by the all-encompassing circle labeled I-WATER.
The central, integrating element of I-WATER is the *hydrologic cycle* as water permeates (and integrates) all the components of the biophysical climate system including climatic, ecological, and socio-economic and management feedbacks and interactions.

- **I-WATER will produce Ph.D. scientists**
  - To work at the interfaces between hydrologic science, atmospheric science, ecosystem science, and socio-economics.
  - To work in interdisciplinary team-based activities.
  - To incorporate environmental and socio-economic feedbacks, climate variability and scientific uncertainty into scientific and policy analysis.
- **Our research themes involve interacting teams of hydrologists, meteorologists, ecologists, and management experts.**
- **I-WATER features problem-focused research to bridge basic and applied science by combining fundamental research on scientific problems with application of scientific knowledge to actual resource issues.**
- **I-WATER will provide a new generation of Ph.D. students with capabilities to work across disciplines and problem-sheds.**
- **I-WATER Fellows will learn to evaluate and analyze complex non-linear systems interactions, environmental variability, and climate change to develop and apply integrative solutions to pressing current problems.**
- **I-WATER is based on an integrated approach to:**
  - hydrologic and water resource science and engineering,
  - land-surface-atmosphere interactions,
  - ecosystems science,
  - water management and policy.
- **I-WATER will apply three dimensions of integration to scientific solutions of water-based environmental problems:**
  - Integration of disciplines,
  - Integration of scales, and
  - Integration of problem-sheds
- **Integration will occur through a new problem-focused approach to education and research.**

I-WATER will emphasize interdisciplinary research at the *interfaces* between hydrologic, atmospheric, ecologic, and management disciplines. These interfaces give rise to the following I-WATER Research Themes.

**Research Theme 1: Integrated Hydrologic, Atmospheric and Ecologic systems**

- Coupling atmospheric, ecologic, and hydrologic processes.
- Understanding the two-way interactions between atmospheric and land-surface processes is critical to understanding climate variability and change, vegetation function, and watershed hydrology.
- Spatial and temporal scaling issues in hydrologic processes
  - Global change, regional hydrology, and interactive ecosystems
  - Feedbacks among climate, hydrology, and ecosystems at regional scales
• Evaluation of spatial and temporal variability of precipitation, soil moisture, and ecosystem function in the western United States
• Land surface-atmospheric feedbacks on the complex dynamics of precipitation and soil moisture at seasonal and longer time scales
• Land surface, vegetation, atmosphere feedbacks on the regional scale

Research Theme II: Integrated Hydrologic, Ecologic, and Socio-economic systems

- Defining changes in water, nutrients and sediment transports due to variability and change in climate/weather, land cover/land use, and water resources management.
- Developing models to ‘optimize’ ecosystem resilience and human economic activity that bear on the hydrologic cycle at regional scales
  - Non-native species invasion and extinction of native species
  - Processes governing grasslands to shrub-land conversions
  - Balancing economic and ecosystem needs for water in modified river basins.

Research Theme III: Integrated Hydrologic, Atmospheric, Socio-economic systems

- Regional, integrated assessment of vulnerability and sustainability of hydrologic and water resource systems, ecologic and socio-economic systems to environmental variability and climate change
  - Hydrologic-ecologic-socioeconomic vulnerability and sustainability analysis to drought and climate variability
  - Regional hydrologic vulnerability and hydrologic extremes
  - Coupling among stakeholder sectors and ecological outcomes in a regulated river system: droughts

Research Theme IV: I-WATER Research Integration and Synthesis

Research integration and synthesis will be achieved through the following activities:

- I-WATER scholars will be organized in Research Theme Groups
- Each Research Theme Group will be composed of student-led Research Teams
- Each Research Team will work on a specific multidisciplinary problem within each Research Theme
- I-WATER scholars will work within the Research Team on a specific research problem
- Integration occurs at the Research Team level and at the Research Group level
- Fall Semester Activities – Integration at the Interfaces
  - Student-led Research Teams will tackle semester long integrative activities within the context of real-world problems
  - Research teams will produce scientific assessments to define knowledge, knowledge gaps, recommend actions, and propose solutions
- Spring Semester Activities – Global I-WATER Integration
  - Each Research Theme Group will organize a series of 4 seminar/workshops. All I-WATER scholars and Faculty are required to participate
- Participation in Hydrology Days
- Participation in the Annual I-WATER Symposium
## Distribution and Frequency of I-WATER Activities

### I-WATER

<table>
<thead>
<tr>
<th>Research Theme I</th>
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<td>Integrative PhD research ** - Daily</td>
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**Team** | **Team** | **Team** | **Team** | **Team** | **Team** | **Team** | **Team** | **Team**
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This typical I-WATER Fellow schedule illustrates the rich opportunities that will occur via interactions at different levels.

*Although these workshops or seminar series must be organized by each Research Theme Group, all I-WATER members are required to participate therefore achieving integration at the level of the entire I-WATER program.*

**Integrative Team PhD research at the Research Theme level.**

***Integrative Problem Solving Activity (IPSA) at the Research Team level during Fall semesters.*
I-WATER: Curriculum

- **Gateway Courses**
  - I-WATER scholars will be required to take gateway courses in fields relevant to their research theme areas and complementary to their disciplines.
  - Gateway courses will be selected from existing course offerings at CSU.
  - Gateway courses will provide a basic level of language and knowledge in particular fields.
  - Students will be required to take two gateway courses from complementary disciplines, typically during their first two semesters.
  - For example, a scholar in Research Theme I whose background is atmospheric science would be required to take a gateway course in hydrologic science and a gateway course in ecosystem science.

- **Core Courses**
  - I-WATER has developed a new core curriculum that takes an earth system science perspective to address multidisciplinary problems in each research theme with hydrology as an integrative element.
  - The I-WATER core curriculum is composed of a new interdisciplinary course in each Research Theme area.
  - I-WATER scholars will be required to enroll in two core courses to be taken during the first two years of the program.
  - The development of the core curriculum is a collaborative and joint effort of the I-WATER PIs. However, further enhancement and development of the core curriculum will involve invited I-WATER faculty associates, therefore offering an additional opportunity for integration across the disciplines.

- Training in ethics

I-WATER Fellows’ Academic and Research Progression

- I-WATER scholars will take at least three years to finish their courses and research training programs. The I-WATER program will fund three of those years as follows:
  - Two years will be funded through an I-WATER Fellowship
  - One year will be funded through a research assistantship in the I-WATER Fellow home department.

<table>
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<tr>
<th>WATER-IGERT Educational and Research Progression</th>
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<tr>
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<td><strong>Departmental Requirements</strong></td>
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<td><strong>WATER Core Courses</strong></td>
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<td><strong>Gateway Courses</strong></td>
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<td><strong>WATER Dissertation Research</strong></td>
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I-WATER Internship/Teaching Opportunities

Advanced I-WATER scholars will be encouraged to undertake internships in national laboratories, agencies and leading-edge private-sector firms. The internships will typically occur during the third year of each I-WATER fellow’s program.

National and international institutions as well as leading edge consulting firms with close ties to scientific work in federal and international agencies have agreed to host I-WATER students for up to a year including the US Forest Service (Fort Collins), NCAR (Boulder), NASA GSFC, the USDA-ARS (Fort Collins), the Biological Resources Division of the USGS (Fort Collins), the USBR (Denver), Riverside Technology, Inc. RTi, the Institute of Environmental Engineering, and the Swiss Federal Institute of Technology, ETH-Zurich, Switzerland.

- Internship opportunities at:
  - U.S. Bureau of Reclamation
  - U.S. Geological Survey
  - U.S. Forest Service
  - NCAR
  - NASA Goddard Space Flight Center
  - ARS – U.S. Department of Agriculture
  - Riverside Technology, Inc.
  - Swiss Federal Institute of Technology, Zurich (ETH-Z)

I-WATER Fellows will also be encouraged to gain teaching experience through teaching assistantships in their home departments.
### Requirements for all I-WATER Fellows funded by the I-WATER IGERT Program at Colorado State University

- Be admitted to one of the participating departments; maintain status as a full-time PhD candidate in good standing in the home department; and successfully complete all doctoral degree requirements of the home department.
- Conform to and meet all other regulations and requirements of their home department, the I-WATER program, and the Graduate School at Colorado State University.
- Take at least two I-WATER Core courses. These courses may also count toward the degree requirements of the home department, and should be completed within the first two years of the program.
- Take at least two I-WATER Gateway courses. These courses may also count toward the degree requirements of the home department, and should be completed within the first two years of the program.
- Participate in the annual orientation retreat at the beginning of the fall semester.
- During the fall semester each year, participate in an integrative, interdisciplinary applied research activity, which will be organized per Research Theme. These research activities will vary from year to year and will be defined and assigned during the annual retreat.
- During the spring semester each year, organize and participate in a weekly I-WATER seminar/workshop series. Fellows associated with each of the three main research themes will organize and present 4 seminars/workshops each for a total of 12 weekly seminars/workshops.
- Present papers on their research progress at the I-WATER Session of Hydrology Days each spring.
- Organize and participate in the Annual I-WATER Symposium at the end of each spring semester.
- Participate in all I-WATER program assessment activities, including filling out the annual NSF IGERT Program report, and the internal assessment at the annual retreat.
- Select a Ph.D. advisory committee chaired by the I-WATER faculty mentor, and including at least one other I-WATER faculty member from a different but complementary WATER discipline.
- Write and defend a dissertation proposal in WATER science, and complete and defend a dissertation on a topic advancing the programmatic interdisciplinary and integrative research goals of I-WATER.
- Attend two national interdisciplinary research conferences or professional meetings during their program (one per year during the second and third year) with partial travel support from I-WATER.
- I-WATER scholars are required to submit a research proposal and annual progress reports. Students who do not meet the expectations of the program will not be continued as I-WATER scholars.
- Because the National Science Foundation places restrictions on the allowable kinds of supplementary compensation, all funding sources of I-WATER Fellows must be explicitly coordinated with the I-WATER program director.

I have read the above requirements and expectations and I understand that continuation of funding is contingent on abiding by and meeting all of these requirements in addition to meeting the usual expectations of academic and research performance in a doctoral program.

<table>
<thead>
<tr>
<th>I-WATER Fellow</th>
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2 Here and throughout this document, WATER stands for Water, Atmosphere, Ecosystem Education and Research.

3 See details of amount supported by I-WATER for conference travel on page 10.
I-WATER Funding

- I-WATER is funded by the IGERT program of the National Science Foundation (NSF)
- IGERT is NSF’s Integrative Graduate Education and Research Traineeship program
- IGERT intends to:
  - meet the challenges of educating U.S. scientists and engineers with the interdisciplinary background, deep knowledge in a chosen discipline, and the technical, professional, and personal skills needed for the career demands of the future.
  - catalyze a cultural change in graduate education by establishing innovative new models for graduate education and training through collaborative research that transcends traditional disciplinary boundaries.
- I-WATER funding from NSF is for 5 years
- Additional I-WATER funding comes from the following CSU units:
  - Departments of Civil and Environmental Engineering, Atmospheric Science, and Biology
  - Colleges of Engineering and Natural Sciences
  - Graduate School, Office of the Provost, Office of the Vice President for Research
I-WATER Stipends, Cost of Education Allowance, and Other Allowable Costs

- All I-WATER Fellows will receive NSF IGERT support for 2 years (24 months per fellow) and will be supported in 12-month increments.
  - All I-WATER Fellows while being funded by the NSF IGERT grant will receive a stipend of $30,000 per year for a 12-month appointment.
  - All I-WATER Fellows will receive a cost-of-education allowance for tuition and normal fees of $10,500 per year.
- In addition, all I-WATER Fellows will receive a third year of support in the form of a graduate research or teaching assistantship at the funding levels customary in the I-WATER Fellow’s home department.

I-WATER Travel Allowance

- I-WATER Fellows are eligible for a travel allowance of up to $1,500 per year for two years. These funds can only be used to meet the requirement of participating in two interdisciplinary research conferences or professional meetings during the program.

Eligible travel expenses
Reimbursement for travel costs up to the maximum allowable may include:
- Round trip transportation costs
- Airport parking costs
- Actual lodging costs
- Per diem allowance for meals not included in the conference
- Conference registration costs

Receipt requirements
- Transportation: Original ticket receipt (i.e. passenger receipt portion of an airticket or e-ticket receipt) showing ticket cost.
- Additional receipt requirements may apply for other forms of transportation.
- Lodging: Original, itemized hotel bill.
- Meals
- Copy of conference program including (1) the conference agenda/schedule of events and (2) the listing of any event including the trainee’s participation.
- Conference Registration Fee: Original receipt.

Procedures
- Application for conference travel support must be submitted at least two months in advance of travel using the I-WATER Travel Request Form (posted on the I-WATER website and shown also at the end of this document)
- If applicable, a copy of any abstract, paper and presentation must be submitted with your application.
- The paper and/or presentation must explicitly acknowledge the support received from the I-WATER Program and the National Science Foundation. The acknowledgement should appear at the bottom of the title page, and should read:
This paper is based upon work supported by National Science Foundation Grant No. DGE-0966346 “I-WATER: Integrated Water, Atmosphere, Ecosystems Education and Research Program” at Colorado State University.

- The paper and/or presentation must also identify the trainee as a member of the I-WATER Program and of his or her home academic department. The acknowledgement must appear on the title page. The recommended format is:

  First Middle Last Name  
  I-WATER IGERT  
  Department of [Name]  
  Colorado State University
I-WATER Evaluation and Assessment Plan

1. Program Evaluation

I-WATER recognizes the importance of effective program assessment. To establish baselines for analysis, an initial survey will be administered to all I-WATER scholars in order to gather data and establish the participants’ perceptions of I-WATER research issues (e.g., barriers and opportunities for multi-disciplinary education in I-WATER, etc.).

The I-WATER program will be evaluated in several ways.

- Student Interviews and Progress Reports, by the program Director and Executive Committee as well as by designated I-WATER faculty.
- Evaluation Survey of Students and Faculty, by internal or external process (see below) in order to address the central effectiveness question of the project: “to what extent are we equipping graduate students to work at the interface of the program disciplines in a transformative and integrative way?”
- Student Evaluation of I-WATER courses
- Annual NSF-Progress Report (April 15th – May 15th, on-line survey)
- Regular informal evaluations of the program will be conducted throughout the program including brief discussion sessions during which participants will be encouraged to provide assessment and constructive criticism of I-WATER.
- I-WATER will provide opportunities for anonymous written comments from the I-WATER scholars.
- At the end of the program, exit interviews will include a written evaluation to measure outcomes of the I-WATER experience.
- At the mid-point of the program, an overall assessment will be conducted via an external evaluation team.
- Internal program assessments will be scheduled every year at the retreat during which the program will be evaluated also by other quantitative metrics, like those listed below.
- During the annual I-WATER Symposium, Hydrology Days and/or the Front Range Student Ecology Symposium, external judges will be asked to evaluate the topic, content and presentation of the I-WATER scholars. I-WATER faculty will review these evaluations, as well as those of the faculty advisors and I-WATER students themselves.

A partial list of traditional metrics to evaluate the program includes:

- level of collaborative work among faculty in involved disciplines
- joint publications in major journals
- new multidisciplinary courses developed
- quality of students recruited to the program
- qualified underrepresented students recruited to the program
- active participants in the Research Theme Groups
- seminars organized
- workshops offered and the external participation they attract
- presentations delivered at professional meetings
- leveraged internships arranged with participating agencies and industries,
- career outcomes of I-WATER graduates.

2. **Annual NSF (web-based) reports**
The National Science Foundation requires that all IGERT programs file an annual report to the Foundation, which is collected via a web-based system. All I-WATER Fellows are required to complete the designated trainee component, and all I-WATER Faculty Mentors are required to input to other components. This annual report must report all I-WATER Fellow’s activities, including publications and conference presentations.

3. **NSF site visits**
A team of external evaluators typically reviews each IGERT once during each five-year award period. The review consists of a site visit by a team of experts, interviews of program participants, and the preparation of an extensive report.
I-WATER Fellow Evaluation

I-WATER scholars are required to submit a research proposal and annual progress reports. Students who do not meet the expectations of the program will not be continued as I-WATER scholars. An annual progress report is due August 1st of Years 2-3 of the program.

I-WATER Project Proposals

I-WATER scholars must develop a dissertation research project explicitly addressing interdisciplinary (i.e., feedbacks and interactions) research questions at the interfaces between atmospheric, terrestrial and aquatic ecosystem, and socio-economic system processes, mediated by hydrologic fluxes.

It is the responsibility of the advisor and the co-advisor of I-WATER scholars to ensure that this requirement is met. If an I-WATER scholar does not meet this expectation the advisor and co-advisor may be denied the opportunity to have future students funded by the I-WATER program.

I-WATER Scholars will submit a research proposal to the I-WATER Executive Committee no later than by November 30th in the third semester of their graduate program. The Executive Committee will review the proposals. Revisions to the proposal may be required.

I-WATER project proposals should not exceed 6 pages. Tables and figures can be included but will not be counted towards the page length. As expected of PhD research, I-WATER scholars must write their proposal independently. However, advisor and co-advisor must sign off on the final proposal, confirming the intended project.

It is fully anticipated that the I-WATER scholars’ project will follow the plan of the research proposal. If deviations from the proposal are made, this needs to be presented and justified in the Annual Progress Report, due August 1st of each year.

Annual Progress Reports by I-WATER scholars

- The annual progress report will specifically address the progress towards the goals defined in the approved I-WATER research project proposal. Reports are due by August 1st.
- The progress report should not exceed five pages and may additionally include figures and tables. The report should include citation of the literature, as appropriate.
- The progress report should be a list of accomplishments towards the project goals. Any proposed change in project goals will need to be explained and subsequently approved.

The Executive Committee will use the progress reports to determine whether I-WATER funding will be continued. The I-WATER program may request an informal written progress report at any other time if the Executive Committee is concerned that a student is making inadequate progress to merit continued funding.

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4 Doctoral committees must include two co-major advisors selected from the I-WATER Faculty, and representing two separate disciplines of the I-WATER program.
I-WATER Executive Committee

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**A. Scott Denning,**
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### I-WATER Faculty Mentors/Associates Fall 2011-2012

<table>
<thead>
<tr>
<th>Faculty Mentor</th>
<th>Department</th>
<th>Email</th>
<th>I-WATER Fellow</th>
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<tbody>
<tr>
<td>Russ Schumacher</td>
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### I-WATER Faculty Mentors/Associates Fall 2012-2013

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<th>I-WATER Fellow</th>
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<tbody>
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### I-WATER Faculty Mentors/Associates Fall 2013-2014

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<tbody>
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### I-WATER Faculty Mentors/Associates Fall 2014-2015

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</tr>
<tr>
<td>Christian Kummerow</td>
<td>Atmospheric Science</td>
<td><a href="mailto:Christian.Kummerow@ColoState.edu">Christian.Kummerow@ColoState.edu</a></td>
<td>Gavin Roy</td>
</tr>
</tbody>
</table>
### I-WATER Fellows 2011-2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Email</th>
<th>Faculty Mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanessa Vincente</td>
<td>Atmospheric Science</td>
<td><a href="mailto:vvincent@atmos.colostate.edu">vvincent@atmos.colostate.edu</a></td>
<td>Russ Schumacher</td>
</tr>
<tr>
<td>Aaron Piña</td>
<td>Atmospheric Science</td>
<td><a href="mailto:Aaron.Pina@ColoState.edu">Aaron.Pina@ColoState.edu</a></td>
<td>Scott Denning</td>
</tr>
<tr>
<td>Isaac Medina</td>
<td>Atmospheric Science</td>
<td><a href="mailto:Isaac.Medina@ColoState.edu">Isaac.Medina@ColoState.edu</a></td>
<td>Scott Denning</td>
</tr>
<tr>
<td>Dylan Harrison-Atlas</td>
<td>GDPE</td>
<td><a href="mailto:dylan.hatlas@gmail.com">dylan.hatlas@gmail.com</a></td>
<td>Dave Theobald</td>
</tr>
<tr>
<td>David Martin</td>
<td>Biology/GDPE</td>
<td><a href="mailto:davidminormartin@gmail.com">davidminormartin@gmail.com</a></td>
<td>LeRoy Poff</td>
</tr>
<tr>
<td>Joel Sholtes</td>
<td>Civil and Env. Eng.</td>
<td><a href="mailto:jsholtes@gmail.com">jsholtes@gmail.com</a></td>
<td>Brian Bledsoe</td>
</tr>
</tbody>
</table>

### I-WATER Fellows 2012-2013

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Email</th>
<th>Faculty Mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander Maas</td>
<td>Ag. &amp; Resource Economics</td>
<td><a href="mailto:alexander.s.maas@gmail.com">alexander.s.maas@gmail.com</a></td>
<td>Christopher Goemans</td>
</tr>
<tr>
<td>Erick Carlson</td>
<td>GDPE</td>
<td><a href="mailto:Erick.Carson@ColoState.edu">Erick.Carson@ColoState.edu</a></td>
<td>David Cooper</td>
</tr>
<tr>
<td>Grace Lloyd</td>
<td>Horticult &amp; Landscape Arch</td>
<td><a href="mailto:gslloyd@rams.colostate.edu">gslloyd@rams.colostate.edu</a></td>
<td>William Bauerle</td>
</tr>
<tr>
<td>Laurel Lynch</td>
<td>GDPE</td>
<td><a href="mailto:lynchl@stolaf.edu">lynchl@stolaf.edu</a></td>
<td>Matthew Wallenstein</td>
</tr>
<tr>
<td>Nick Sutfin</td>
<td>Geosciences</td>
<td><a href="mailto:nicksutfin@gmail.com">nicksutfin@gmail.com</a></td>
<td>Ellen Wohl</td>
</tr>
</tbody>
</table>

### I-WATER Fellows 2013-2014

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Email</th>
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<tbody>
<tr>
<td>Aaron Piña</td>
<td>Atmospheric Science</td>
<td><a href="mailto:Aaron.Pina@ColoState.edu">Aaron.Pina@ColoState.edu</a></td>
<td>Scott Denning</td>
</tr>
<tr>
<td>Amber Childress</td>
<td>ESS/GDPE</td>
<td><a href="mailto:achildre@rams.colostate.edu">achildre@rams.colostate.edu</a></td>
<td>Dennis Ojima</td>
</tr>
<tr>
<td>Andre Dozier</td>
<td>Civil and Env. Engineering</td>
<td><a href="mailto:Andre.Dozier@rams.ColoState.edu">Andre.Dozier@rams.ColoState.edu</a></td>
<td>Mazdak Arabi</td>
</tr>
<tr>
<td>Codie Wilson</td>
<td>Ecosyst Sci. &amp; Sustainability</td>
<td><a href="mailto:codiewilson@icloud.com">codiewilson@icloud.com</a></td>
<td>Stephanie Kampf</td>
</tr>
<tr>
<td>Derek Shook</td>
<td>Geosciences</td>
<td><a href="mailto:Derek.Shook@ColoState.edu">Derek.Shook@ColoState.edu</a></td>
<td>Sara Rathburn</td>
</tr>
<tr>
<td>Karie Boone</td>
<td>Geosciences</td>
<td><a href="mailto:Karie.Boone@ColoState.edu">Karie.Boone@ColoState.edu</a></td>
<td>Melinda Laituri</td>
</tr>
<tr>
<td>Morgan Phillips</td>
<td>Atmospheric Science</td>
<td><a href="mailto:morganp@atmos.colostate.edu">morganp@atmos.colostate.edu</a></td>
<td>Scott Denning</td>
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<tr>
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<td>Russ Schumacher</td>
</tr>
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</table>

### I-WATER Fellows 2014-2015

<table>
<thead>
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<th>Name</th>
<th>Department</th>
<th>Email</th>
<th>Faculty Mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gavin Roy</td>
<td>Atmospheric Science</td>
<td><a href="mailto:Gavin.Roy@ColoState.edu">Gavin.Roy@ColoState.edu</a></td>
<td>Christian Kummerow</td>
</tr>
<tr>
<td>Whitney Beck</td>
<td>Biology &amp; GDPE</td>
<td><a href="mailto:Whitney.Beck@ColoState.edu">Whitney.Beck@ColoState.edu</a></td>
<td>N LeRoy Poff</td>
</tr>
<tr>
<td>Rosemary Records</td>
<td>Ecosyst Sci. &amp; Sustainability</td>
<td><a href="mailto:Rosemary.Records@ColoState.edu">Rosemary.Records@ColoState.edu</a></td>
<td>Steven Fassnacht</td>
</tr>
<tr>
<td>Isabella Olesky</td>
<td>GDPE</td>
<td><a href="mailto:BellaOlesky@gmail.com">BellaOlesky@gmail.com</a></td>
<td>Jill Baron</td>
</tr>
</tbody>
</table>
I-WATER Academic Departments and Contacts

Department of Civil and Environmental Engineering
Colorado State University
I-WATER Office Room A-218 Engineering Building
Fort Collins, CO 80523-1372
Telephone: (970) 491-4384
Fax: (970) 491-7727
Web: http://I-WATER.ColoState.edu/

- I-WATER Program Director
  Jorge A Ramirez, (970) 491-7621
e-mail: i-water@engr.colostate.edu

- I-WATER Program Coordinator
  Karleene Schindler, (970) 491-4384
e-mail: karleene@engr.colostate.edu

Department of Atmospheric Science
Colorado State University
Fort Collins, CO 80523-1371
Telephone: (970) 491-8682
Fax: (970) 491-8449

Department of Biology
Colorado State University
Fort Collins, CO 80523
Telephone: (970) 491-7011
Fax: (970) 491-0649
I-WATER Fellow Core Course Approval Form

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date of Request:</th>
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<tr>
<td>CSU ID Number:</td>
<td>e-mail Address:</td>
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**CORE COURSES**

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<thead>
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<th>Semester Taken</th>
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</table>

**SIGNATURES**

I-WATER Fellow ____________________________  I-WATER Faculty Mentor ____________________________

Date ____________________________  Date ____________________________

**I-WATER Core Courses**

- ATS 680 Land-Atmosphere Interactions
- BZ 580 The Scientific Basis for Freshwater Sustainability
- CIVE 625 Quantitative Eco-Hydrology
- CIVE 626 Integrated Analysis of Coupled Water Issues

Approved by: ____________________________  Date: ____________________________

Provisions: ____________________________
# I-WATER Fellow Core Course Approval Form

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## Core Courses

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<td></td>
<td>ATS 680 Land-Atmosphere Interactions</td>
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<tr>
<td></td>
<td>BZ 580 The Scientific Basis for Freshwater Sustainability</td>
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<td>CIVE 680A4 Water and Environmental Integrated Research</td>
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<tr>
<td></td>
<td>CIVE 680A3 Quantitative Eco-Hydrology</td>
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</table>

## Signatures

I-WATER Fellow ___________________________ I-WATER Faculty Mentor ___________________________

Date ____________ Date ____________

### I-WATER Core Courses

- ATS 680 Land-Atmosphere Interactions
- BZ 580 The Scientific Basis for Freshwater Sustainability
- CIVE 680A4 Water and Environmental Integrated Research
- CIVE 680A3 Quantitative Eco-Hydrology

Approved by: ___________________________ Date: ____________

Provisions: ___________________________

---

1 All I-WATER fellows are required to take at least two core courses.
# I-WATER Fellow Gateway Course Approval Form

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date of Request:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU ID Number:</td>
<td>e-mail Address:</td>
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## Gateway Courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
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<th>Justification</th>
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</tbody>
</table>

## Signatures

I-WATER Fellow ________________________________  I-WATER Faculty Mentor ________________________________

Date ________________________________  Date ________________________________

Approved by: ________________________________  Date: ________________________________

Provisions: ________________________________
# I-WATER Fellow Travel Application Form

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date of Request:</th>
<th>CSU ID Number:</th>
<th>e-mail Address:</th>
</tr>
</thead>
</table>

## PURPOSE OF TRAVEL

<table>
<thead>
<tr>
<th>Name of Conference or Workshop:</th>
<th>Academic field of Conference:</th>
<th>Location:</th>
<th>Dates (include travel days):</th>
<th>Paper Title and Author(s) (attach abstract):</th>
<th>Expected Paper Acceptance Date (attach copy of acceptance if available):</th>
</tr>
</thead>
</table>

## BUDGET SUMMARY

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Transportation (air, car, etc.):</td>
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<tr>
<td>Meals (Number of days):</td>
<td></td>
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<tr>
<td>Lodging (Name of Hotel):</td>
<td></td>
</tr>
<tr>
<td>Conference Registration Fee:</td>
<td></td>
</tr>
<tr>
<td>Other (please explain):</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL REQUESTED</strong></td>
<td></td>
</tr>
</tbody>
</table>

If you have requested supplementary funds for this travel from other sources, please:

Name of other source: ________________________________
Amount requested: _________________________________

## PLEASE ATTACH:
- Copy of Conference Program (section listing your presentation)
- Copy of paper/presentation title page and abstract

## SIGNATURES

<table>
<thead>
<tr>
<th>I-WATER Fellow</th>
<th>I-WATER Faculty Mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Date</td>
</tr>
</tbody>
</table>

Amount Approved: _________________________________
Authorized by: _________________________________
Date: _________________________________

Provisions: _________________________________
I-WATER Fellow Doctoral Committee Approval Form

Name: ___________________________ Date of Request: ___________________________
CSU ID Number: ___________________ e-mail Address: ___________________________

I-WATER DOCTORAL COMMITTEE MEMBERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>e-mail address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Mentor and Committee Chair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Committee Member</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIGNATURES

I-WATER Fellow

__________________________
Date

I-WATER Fellow Faculty Mentor

__________________________
Date

I-WATER Fellow Committee Member

__________________________
Date

Approved by: ___________________________ Date: ___________________________
Provisions: ___________________________

1 The doctoral committee of each I-WATER Fellow must include at least two I-WATER Faculty Associates, one of whom must be the I-WATER Fellow’s faculty advisor and chair of the committee.