Webinar
National Association of Marine Laboratories (NAML)

“The Virtual Field: Expanding Field Station and Marine Laboratory Educational Programs with Virtual Experiences”

• Sponsored by the NAML Education Committee
• May 7, 2021
• Speaker: Claudia Luke, Sonoma State University

Link to recording
The Virtual Field

Dr. Claudia Luke
Dr. Sarah Oktay, UC Davis
Dr. Hilary Swain, Archbold Biological Station
Dr. Kari O’Connell, Oregon State University
The Virtual Field

- Background & Opportunities
- Products
- Outcomes
- Next Steps
Background

- 500,000 to 1 million students for 1-2 years
- Loss of field experiences: hands-on skills, motivation, retention, critical thinking and academic success
- All disciplines esp. STEM
- Loss of recruitment into research
Background

Mar 16: University COVID-19 closures

Mar 25: Pitched idea to OBFS listserv

Mar 31: First weekly meeting: 42 field sites

Apr 29: NSF RAPID grant application submitted (PI: Claudia Luke, Co-Pis: Hilary Swain, Kari O’Connell)

May 6: NSF RAPID grant awarded
The Virtual Field
First Year Scramble

1. Create cross-site experiences
2. Advertise and distribute virtual experiences to U.S. universities
3. Evaluate efficacy of efforts and set the stage for further initiatives
Opportunity

“At this moment in time, we are called to lead and act with courage. We are called to embrace change. Change in our societies. Change in the management of our economies. Change in our relationship with our one and only planet.”

United Nations 2014, p. 3
Products
Recreate FSML Learning Experiences

Align with exceptional learning at FSMLs: Undergraduate Field Experiences Network (UFERN) - Delphi Study

- First-Hand and Outdoor
- Skills-Based: Observation, Communication, Critical Thinking
- Social
Create New FSML Experiences

- Cross-site comparisons
- Without barriers to participation
Products

1. Web Portal
2. Ecosystem Exploration Videos
3. Live from the Field Events
4. Share Virtual Events & Digital Resources
5. Training
6. Assessment

Introduction to The Virtual Field
1. Web Portal

- Searchable databases of FSML virtual educational field experiences
- Back-end functions and user-friendly forms for FSMLs to share materials
- Robust: integrated with services of large-scale providers (YouTube, Facebook, WordPress)
1. Portal Design

- LevitJones Holdings LLC
- Sarah Oktay, UC Davis
- Nazir Kassis, Consultant
- Chris Halle, Claudia Luke SSU
  Center for Environmental Inquiry
1. Web Portal

- thevirtualfield.org
2. Ecosystem Exploration Videos

- Teach students observation and communication skills
- 5 minute point-of-view unnarrated videos
- Filmed on smartphones by FSMLs
- Linked to ESA’s Four Dimensional Ecology Education Framework
- Assessment: U-FERN faculty surveys
2. EE Video Production

Terrestrial
- Jorge Ramos
- Ben Bravo
- Patty Saunders
- Beth Norman
- & more

Freshwater
- Itchung Cheung
- Jennifer Seavey
- & more

Marine
- Claudia Luke
- Angie Patterson
- Patty Saunders
- Beth Norman
- Bill Hoese
- & more

Ed Review

Technical
- Sara Kassis
- K. Steinhorst
- Ben Bravo
2. EE Video Products

- 32 ecosystems, 17 FSMLs
- Explorer’s guide + Instructor’s guide
- Searchable by keyword, content, climate zone, biome, habitat, location
3. Live from the Field Events

- Teach students about the process of field research
- Theme-based 50-min Webinar: 3 researchers at 3 field sites followed by live Q&A
- Instructor’s Guides: background reading, assignments
- Assessment: Undergraduate Field Experiences Network (U-FERN)
3. LFTF Design and Production

- Kerry Wininger, Sonoma State Center for Environmental Inquiry
- Hilary Swain, Archbold Biological Station
- Angie Patterson, Black Rock Forest
- Claudia Luke, Sonoma State Center for Environmental Inquiry
3. LFTF Products

- 9 Events, 26 FSMLs, 3 networks (NEON, NutNet, LTER)
- Instructor Guides
- Themes: Fire, Carbon Sequestration, Climate Change…
- Searchable by keyword, topics, content, climate zone, biome, habitat
4. Share Virtual Events

- Event advertisement to international audience
- Sends visitors to FSML registration pages
- 55 virtual events
- 10 FSMLs
- Searchable by keyword and date
4. Share Digital Resources

- FSML maps, webcams, videos, imagery, etc.
- 33 digital resources
- Shared by 10 FSMLs
- Searchable by key word, topic, content, and format
5. Training Videos and Workshops

- Making Field Videos: Into Nature Films (Jennifer Brown)
  Part I: Filming in the Field (20 min)
  Part II: Editing (20 min)

- Production of Ecosystems Exploration Videos, Live from the Field Events

- 360 Immersive Field Trips
Outcomes
<table>
<thead>
<tr>
<th>FSML Collaborators: 26 states, 6 countries</th>
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<tbody>
<tr>
<td>Stacy McNulty Adirondack Ecological Center of SUNY</td>
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<td>Mary Swain, Dustin Angell, Betsy Boughton Archbold Biological Station</td>
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<td>Patricia Saunders Black Fork Wetlands Environmental Studies Center</td>
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<td>Bill Schuster, Angie Patterson Black Rock Forest</td>
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<td>Carlin Barale Potter Cedar Creek Ecosystem Service Reserve</td>
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<td>Al Rossenthal, Rhonda Struminger Centro de Investigaciones Científicas de las Huastecas &quot;Aguazul&quot;</td>
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<td>Aeg Eaton Claytor Nature Center</td>
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<td>Jill Goodball, Anne Kelly, Jason Wallace CSU Chico Ecological Reserves</td>
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<td>Madonna Luke, Ben Bravo, Suzanne DeCourcy, Kerry Winingier, Chris Halls, Sara Kassis CSU Sonoma State Preserves</td>
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<td>Sandra Nierzwiki-Bauer, David Diehl Darrin Fresh Water Institute</td>
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<td>Teresa Mound Ecological Society of America</td>
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<td>Karina Nelson Estuary &amp; Ocean Science Center</td>
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<td>Beth Schmitthenner, Kathryn Malinowski Forfar Field Station</td>
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<td>Megan Dether Friday Harbor</td>
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<td>Jennifer Hunter Hastings Natural History Reservation</td>
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<td>Alichung Cheung Hatfield Marine Science Center</td>
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<td>Brian Koeppel Highlands Biological Station, Coweeta Hydrologic Laboratory, Great Smoky Mountains National Park</td>
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<td>Jan Halm Hubbard Brook Experimental Forest</td>
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<td>Phoebe Jaksielek Hurricane Island Center for Science and Leadership</td>
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<td>Lesley Knoll Nasca Biological Station and Laboratories</td>
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<td>Tony Barnosky/Jorge Ramos Jasper Ridge Biological Preserve</td>
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<td>Ted Karfakis Katomos Island Biological Field Station</td>
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<td>Deedra McClearn La Selva Biological Station</td>
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<td>Beth Norman Lacawac Sanctuary</td>
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<td>Laura Roketenetz Martin Center for Field Studies and Environmental Education</td>
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<td>Renee Brown McMurdo Dry Valleys, Antarctica</td>
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<td>Robin Ventlie Missouri S&amp;T Ozark Research Field Station</td>
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<td>Soren Braker, Donovan Tye, Sofia Rodriguez OTS Costa Rica and South Africa</td>
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<td>Lisa Michels, Margaret Boeger Pepperwood Preserve</td>
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<td>Carli Zawacki Pymatuning Lab of Ecology</td>
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<td>Sonia Nobrega Queen's University Biological Station</td>
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<td>Annie Reithel, Ian Billick Rocky Mountain Biological Laboratory</td>
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<td>Eric Milbrandt Sanibel-Captiva Conservation Foundation</td>
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<td>Russ Bradley Santa Rosa Island Research Station</td>
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<td>Sarah Fenn SF Bay National Estuarine Research Reserve, China Camp State Park and Rush Ranch Open Space Reserve</td>
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<td>Jennifer Seavey Shedd Marine Laboratory</td>
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<td>Lisa Busch Skits Sound Science Center</td>
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<td>Brendan Blowers De León Southern Nazarene University’s Quetzal Education Research Center</td>
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<td>Steven Gibson Strong’s Lost Pines Biological Field Station</td>
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<td>Jacob O’Connell SUNY College of Environmental Science and Forestry</td>
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<td>Sheryl Goodloe The Ecological Research Center and Meeman Biological Station</td>
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<td>Kristin Stanford, Brian Alford The Ohio State University’s Stone Laboratory</td>
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<td>Chris Lorenz TMU Ohio River Biology Field Station</td>
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<td>Amanda Young Toolik Field Station</td>
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<td>Sarah Ottay UC NRS Davis Reserves</td>
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<td>Jennifer Goo, Aldo De La Mora Rodriguez UC NRS James San Jacinto Mountains Reserve</td>
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<td>Catherine Koehler UC NRS McLaughlin Reserve</td>
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<td>Marion Wittmann UC NRS Santa Barbara Reserves</td>
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<td>Kate McCarthy UC NRS Sedgwick Reserve</td>
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<td>Carol O’Connell UFERN</td>
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<td>Amy Vaughan Whipple University of Arizona</td>
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<td>Cameron Gannon University of Georgia Marine Institute</td>
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<td>Alicia Farmer University of Michigan Biological Station</td>
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<td>Renee Brown UNM Sevilleta Field Station</td>
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<td>Gail Goodrow Upham Woods Outdoor Learning Center</td>
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<tr>
<td>Sara Johnston Virginia Coast Reserve LTER, Anheuser-Busch Coastal Research Center</td>
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Network Collaborations
Web Portal 9/20-4/21

- 23,089 page views
- 5,857 total unique visitors
- 8,264 sessions
- United States (4,395 views), United Kingdom (215), Canada (140), Germany (52), China (45), India (45), Australia (39), Brazil (38), Japan (37)
Videos

- 54 views/month/video: The Virtual Field introductory videos
- 48 views/month/video: Live from the Field
- 35 views/month/video: Nature Video Techniques
- 21 views/month/video: Ecosystem Exploration Videos
Participant Affiliations

- 122 US universities
- 20 International universities
- 56 Education centers, non-profits
- 31 FSML staff
- 10 K-12 schools
- 3 Foundations
- 17 Businesses
University Courses

- Chemistry: introductory chemistry
- Earth Sciences: planetary geology, field geology
- Ecology: ecological processes, ecosystem ecology, social ecological systems, population ecology, ecology and environmental science, general ecology, landscape ecology
- Field Methods: quantitative field methods, a watershed year
- Freshwater Aquatic Systems: lakes, streams and rivers, freshwater ecology,
- Geography: environmental remote sensing
- Marine Aquatic Systems: the ocean planet, marine environmental Issues
- Marine Biology: coastal marine biology, biological oceanography, estuarine biology
- Microbiology: bacteriology, microbiomes
- Terrestrial Biology: natural history, introductory biology, California naturalist, botany, zoology, invertebrate biology, invertebrate zoology, trees and forests, conservation biology
- Sustainability: sustainability and resilience
Professions of Attendees

Hydrologist, physical scientist, ecologist, biologist, health scientist, rangeland specialist, natural resources specialist, restoration ecologist, interpretive ranger, aquatic biologist, environmental educator, soil practitioner, veterinarian, farmer, biological resources analyst, sustainability specialist, artist, administrator, director, water quality manager, chemist, clinical associate professor, tribal historic preservation officer, watershed coordinator, water/environmental technician, engineer, botanist, entomologist, geographic information systems, forester, environmental scientist, development and events coordinator, earth and space exploration, librarian, board member, fire management, microbiologist, botanist, ecologist, and conservation biologist
Lessons Learned

- Attractive features are cross-site comparisons, flexibility of application (360 video?)

- Technology is an attractant and a barrier. Must be easy to make, easy to use and must provide support (workshops, videos, one-on-one support)

- Value must be communicated to faculty and FSMLs
Next Steps
Expand Products & Services

- Larger libraries
- Digital learning communities
- Social interaction across sites
- New series:
  - Shadow a professional
  - 360 ecosystems
  - Make your own cross-site tours
Increase Rigor and Assessment

- What are students learning?
- How are faculty using materials?
- What aspects of FSML learning experiences can we recreate?
- Does 360 immersive experiences improve outcomes?
Expand Participation of Students

- Disadvantaged and under-represented students
- Large classes
- Community College and MSIs
- More disciplines
- K-12
- Informal
- International
Expand Participation of Faculty

- Participation after pandemic
- Curriculum integration
- Multiple disciplines
Expand Participation of FSMLs

• Participation after pandemic
• Integration with in-person programs
• Use tracking
• Ease of participation
• Skills training
• Network partnerships
Sustainable Funding

- Broader impacts services
- Grant Proposals: NSF RCN UBE Incubator Grant; NSF Unsolicited, foundations
- Sustainable funding model
Technology that connects us to the planet
Thank you

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