FloodRISE
Resilient Infrastructure & Sustainable Environments

UCIrvine

FLOODRISE: AN INTERDISCIPLINARY APPROACH TO LEVERAGE TECHNOLOGY FOR RESILIENCE

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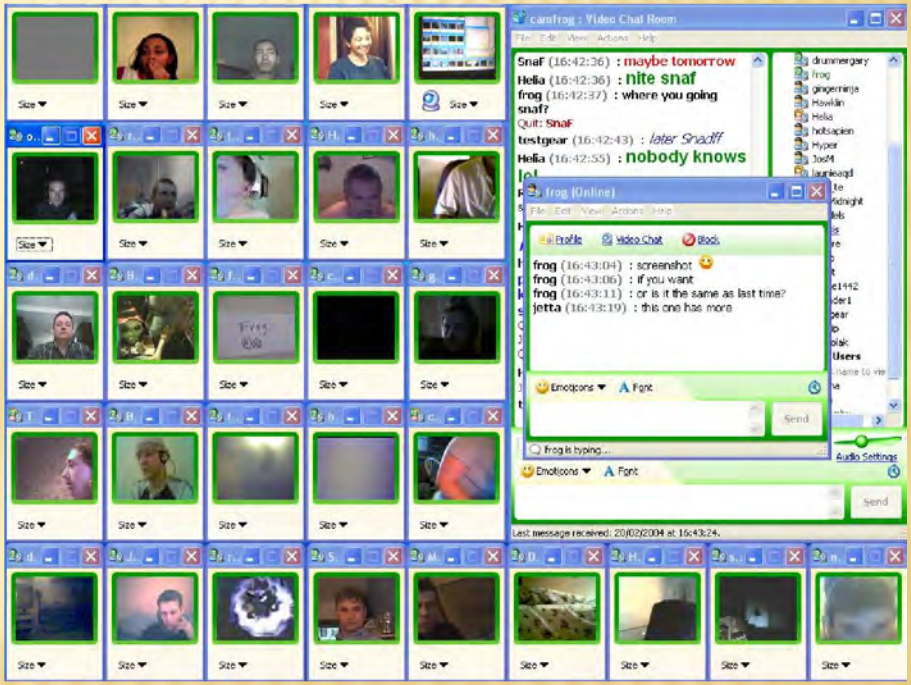
TRANSFORMATIONAL MEDIA LAB

1. **Technology and new media** are changing how people interact with our natural, built, and social worlds.



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Mission:

Our lab studies how media is (and can be) used to transform individuals, communities, and systems.

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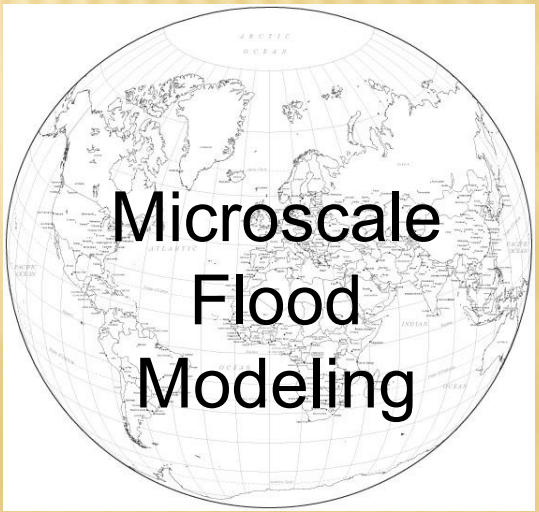


FLOODING BY THE NUMBERS

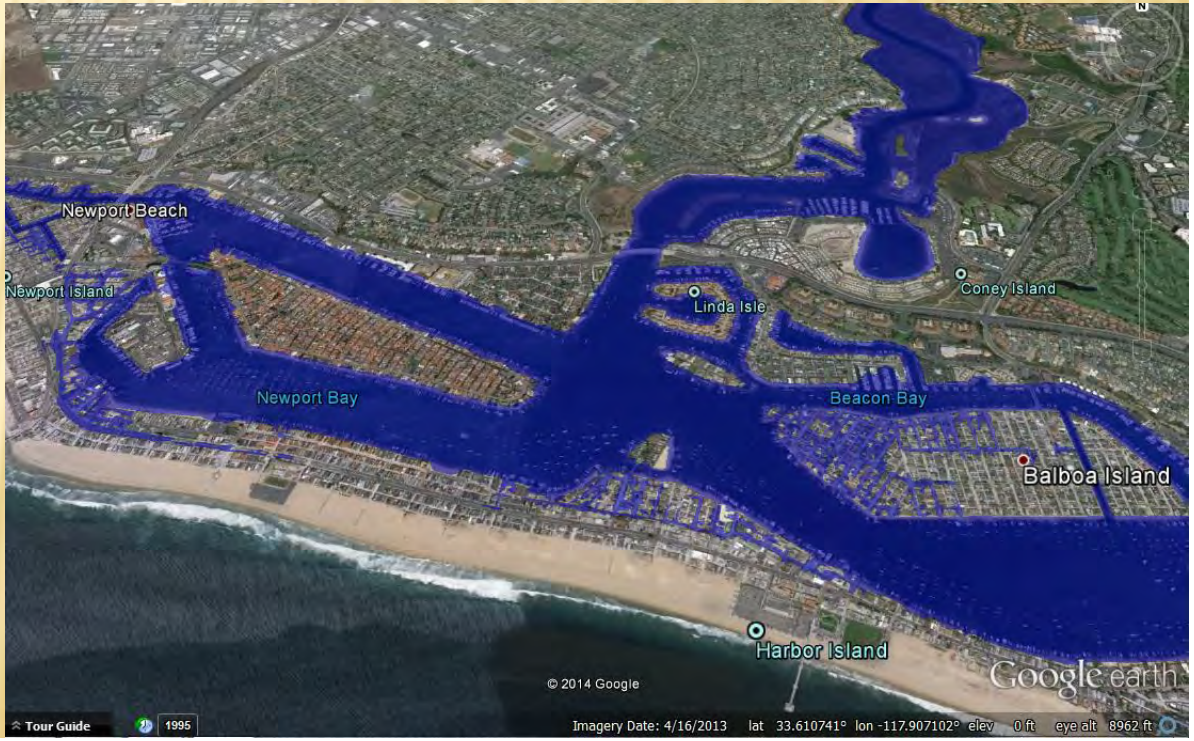
- Estimated global annual damage over $1 trillion by 2050 (Hallegatte et al., 2013)
- Estimated losses in California $300 billion MORE than an earthquake of the same probability (Porter et al. 2011)
- “100 year” flood will become annual occurrence by 2050 (Tebaldi et al. 2012)

FLOODING AND BEHAVIOR

- Many factors
  (social, environmental, economic)
- May levels of decision-making
  (National, State, Local, Public)
- Many possible scenarios
  (e.g., models vary)
- Many possible “solutions”
  (development, restoration, response)

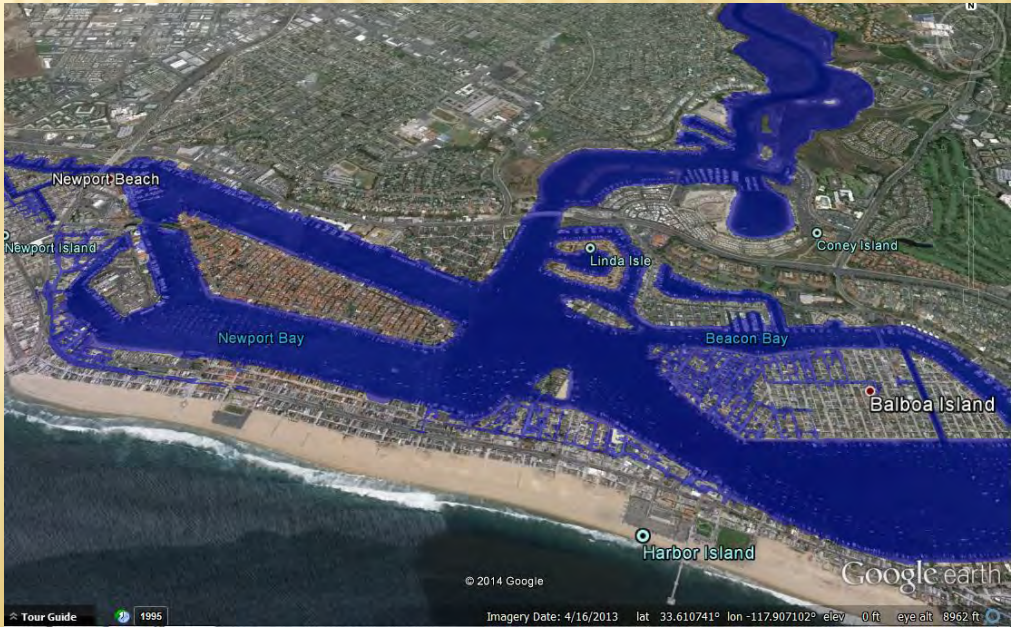
FLOODING AND NEW TECHNOLOGY

- Only available over last 5 years or so
- Builds on existing digital models of cities
- Urban coastal flood hazard models pioneered at UCIrvine
- Produces output at the scale of legal land parcels



FLOODRISE (RESILIENT INFRASTRUCTURE AND SUSTAINABLE ENVIRONMENTS)

- We aim to:
  - Improve access to credible information about flooding
  - Promote cost-effective responses to flooding hazards
  - Change the conversation about “climate change”
- By creating a decision-support tool that is:
  - Human-centered
  - Sensitive to context
  - Scalable
  - Collaborative



FLOODRISE RESEARCH TEAM

- Modeling Team
- Social Ecology Team
- Integration & Impact Team

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- Social Ecology Team
- Integration & Impact Team

Brett Sanders
Engineering

Jay Famiglietti
Earth Systems Science

Ed Balston
Economics

Amir AghaKouchak
Economics

FLOODRISE RESEARCH TEAM

- Modeling Team
- **Social Ecology Team**
- Integration & Impact Team

Richard Matthew
Political Science

Victoria Basolo
Urban Planning

David Feldman
Public Policy

Doug Houston
GIS

RESEARCH TEAM

- Modeling Team
- Social Ecology Team
- **Integration & Impact Team**

Abigail Reyes
Director
Sustainability Initiative

Kimberly Serrano
Project Manager
Newport Beach Site Coordinator

Dani Boudreau
Tijuana Site Coordinator

FLOODRISE RESEARCH APPROACH

- Engineering Team:
  - Build parcel-scale flood models
- Social Ecology Team:
  - Measure perceptions of flood risks and attitudes about appropriate responses
  - Craft and test communication strategies
- Integration and Impact Team
  - Work with stakeholders to identify cost-effective interventions

5 Engaging undergraduate and graduate students in all aspects of research to develop flood risk competence in the next generation of leaders

Richard Matthew, 10/16/2014

NEWPORT BEACH, CALIFORNIA

FEMA VS. FLOODRISE

HOUSEHOLD SURVEYS

1. Assess flood perception, experience, and preparedness
2. Identify promising information sources for future communication
3. Investigate responses to flood maps and test FloodRISE vs. FEMA map

PRELIMINARY RESULTS

FEMA Map	Engineering Map

PRELIMINARY RESULTS

- 8-item scale (Karlin & Ford, 2013)

	Mean	SD	α
Usability Perception Scale			.84
1. I am able to get the information I need easily.	5.615	1.704	
2. I think the image is difficult to understand.	6.010	1.708	
3. I feel confident interpreting the information in this image.	5.971	1.579	
4. A person would need to learn a lot in order to understand this image.	5.909	1.682	
5. I gained information from this image that will benefit my life.	4.644	1.951	
6. I do not find this image useful.	5.577	1.952	
7. I think that I would like to use this image frequently.	3.168	1.950	
8. I would not want to use this image.	5.115	2.159	

PRELIMINARY RESULTS

- T-Test for individual items

	Map Type					
	FEMA		FloodRISE			
	M	*SD*	*M*	*SD*	t	p
Usability Perception Scale (average)	4.991	1.276	5.345	1.241	2.480	.014
I am able to get the information I need easily.	5.307	1.853	5.860	1.567	-2.269	.025
I gained information from this image that will benefit my life.	4.080	1.930	4.975	1.922	-3.321	.001
I would not want to use this image.	4.596	2.254	5.492	2.034	-3.019	.003

PRELIMINARY RESULTS

Findings:

37. Now that you have viewed this map, how would you rate your awareness of where flooding could occur in your community, on a scale of 1 (not aware) to 7 (very aware)?

Not aware 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ Very aware 7 ○

	Map Type							
	FEMA			FloodRISE				
	M	*SD*	n	*M*	*SD*	n	t	p
Map_FloodAwareness	5.818	1.426	88	6.205	1.071	117	2.132	.035

PRELIMINARY RESULTS

Findings:

35. Has your understanding of risk changed as a result of seeing this map?

- ○ Increased
- ○ Decreased
- ○ Stayed the same

Please explain.

	Map Type					
	FEMA		FloodRISE			
	M	*SD*	*M*	*SD*	t	p
Visual info helpful	0.135	0.3435	0.246	0.4324	-2.078	.039
Not enough info	0.135	0.3435	0.049	0.2171	2.070	.040
See how flood affects	0.034	0.1815	0.107	0.3098	-2.142	.033

FLOODRISE OUTLOOK

- NSF Funding for 2013-2107
- NSF proposal in revision to use citizen science to validate models and increase flood risk awareness
- Proposal submitted to add a site in South Korea
- Vision: A global network of experts in flood modeling and risk communication focused on combating coastal flooding in a changing climate

13 NSF proposal in progress to test crowdsourcing as an approach to model validation and raising flood risk awareness

Richard Matthew, 10/16/2014

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THANK YOU!

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