



PennState

# CLIMA | Center for Climate Risk Management

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## VISION

To identify sustainable, scientifically sound, technologically feasible, economically efficient, and ethically defensible climate risk management strategies.

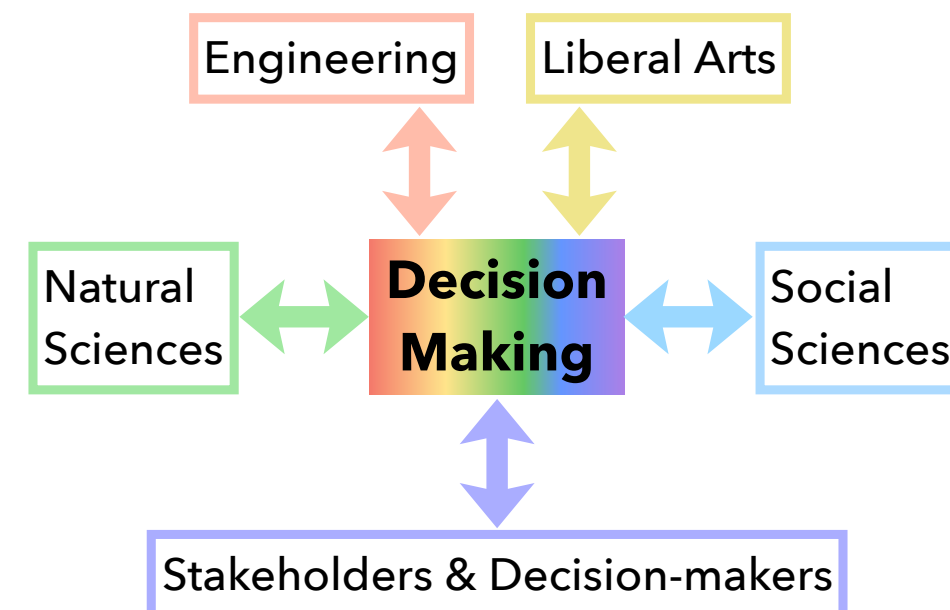
## GOALS

- » To promote interaction among faculty, students, and staff in the growing interdisciplinary field of climate risk management (x.e.g., through seminars, workshops, research, education, tools, data, and outreach).
- » To inform the design of climate risk management strategies.
- » To enable new insights into the Earth system in the Anthropocene.

## CHALLENGES

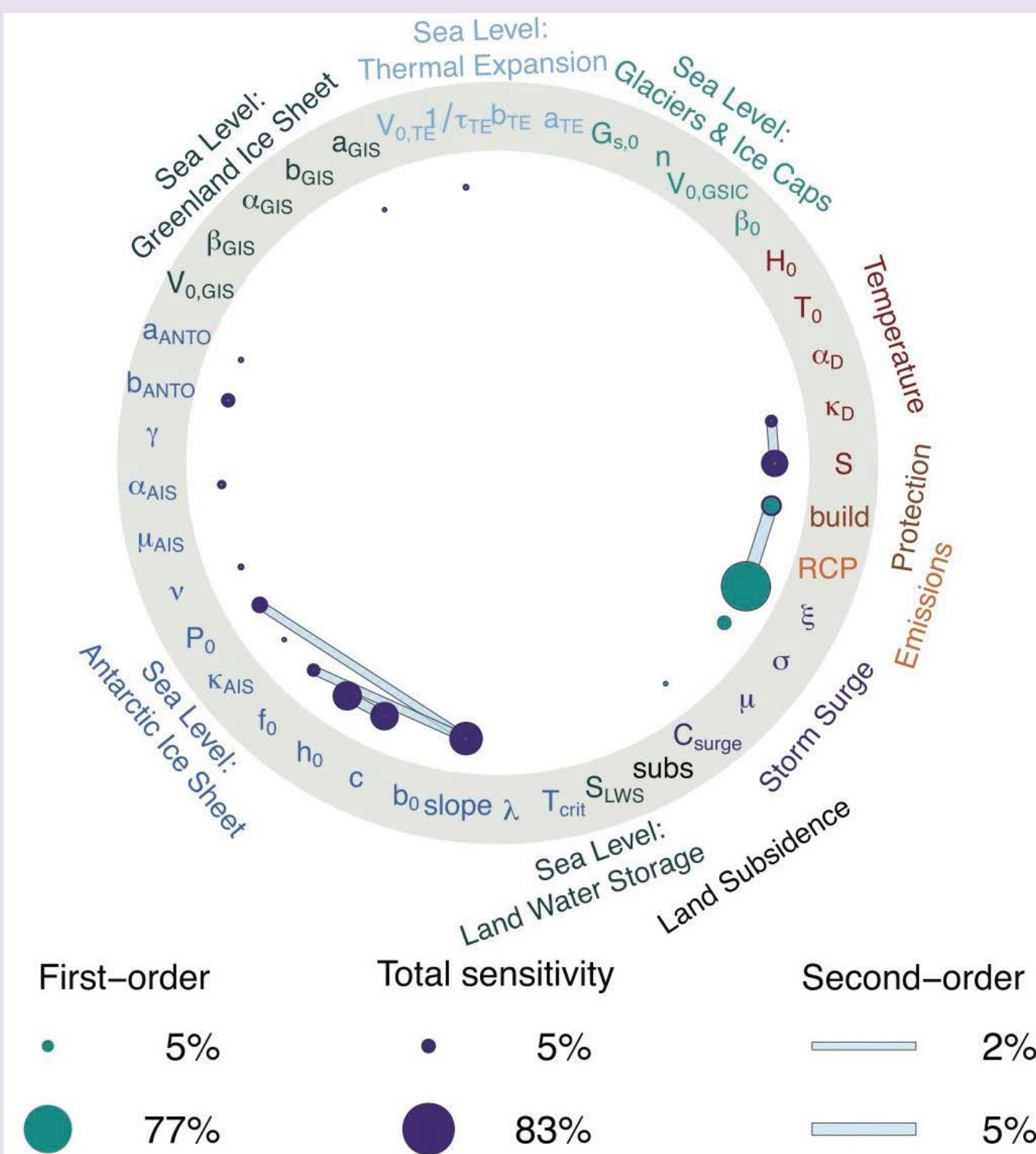
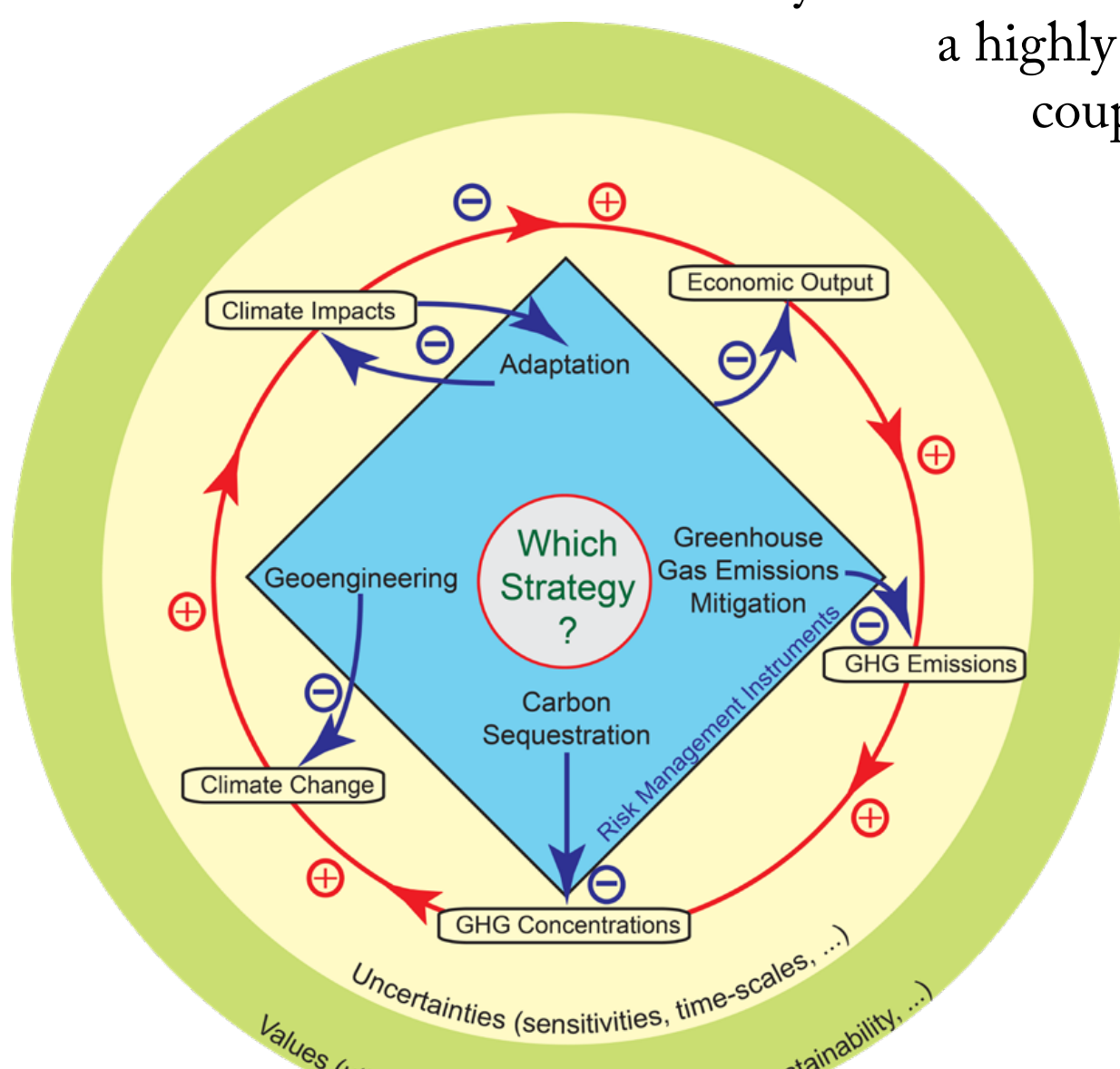
### Linking Disciplines

Analyzing and designing climate risk management strategies requires a convergent research approach to link often disjointed disciplines.



### Complex Trade-Offs

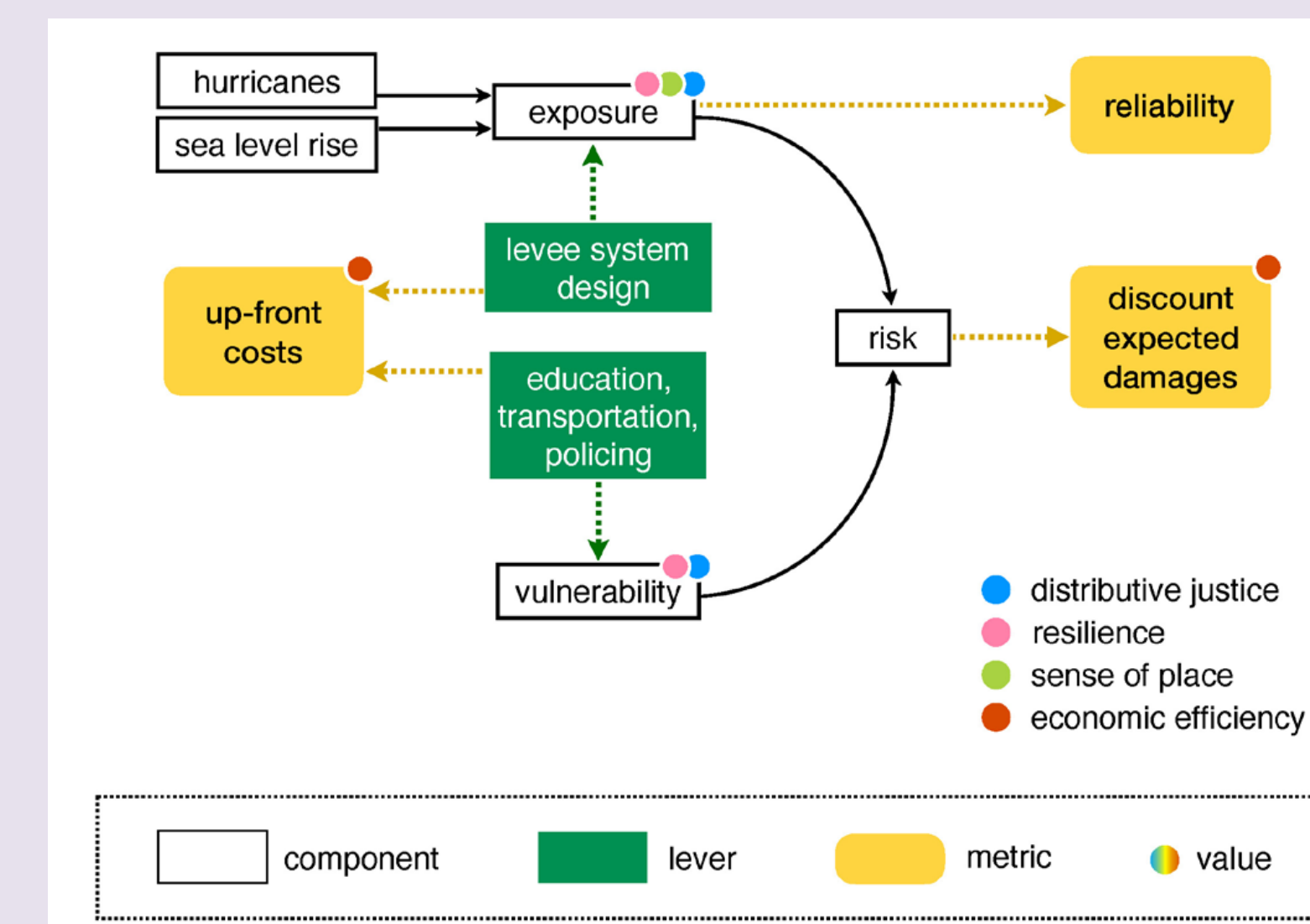
Climate risk management requires choosing a strategy to navigate complex trade-offs between values under deep and dynamic uncertainties in a highly nonlinear coupled system.



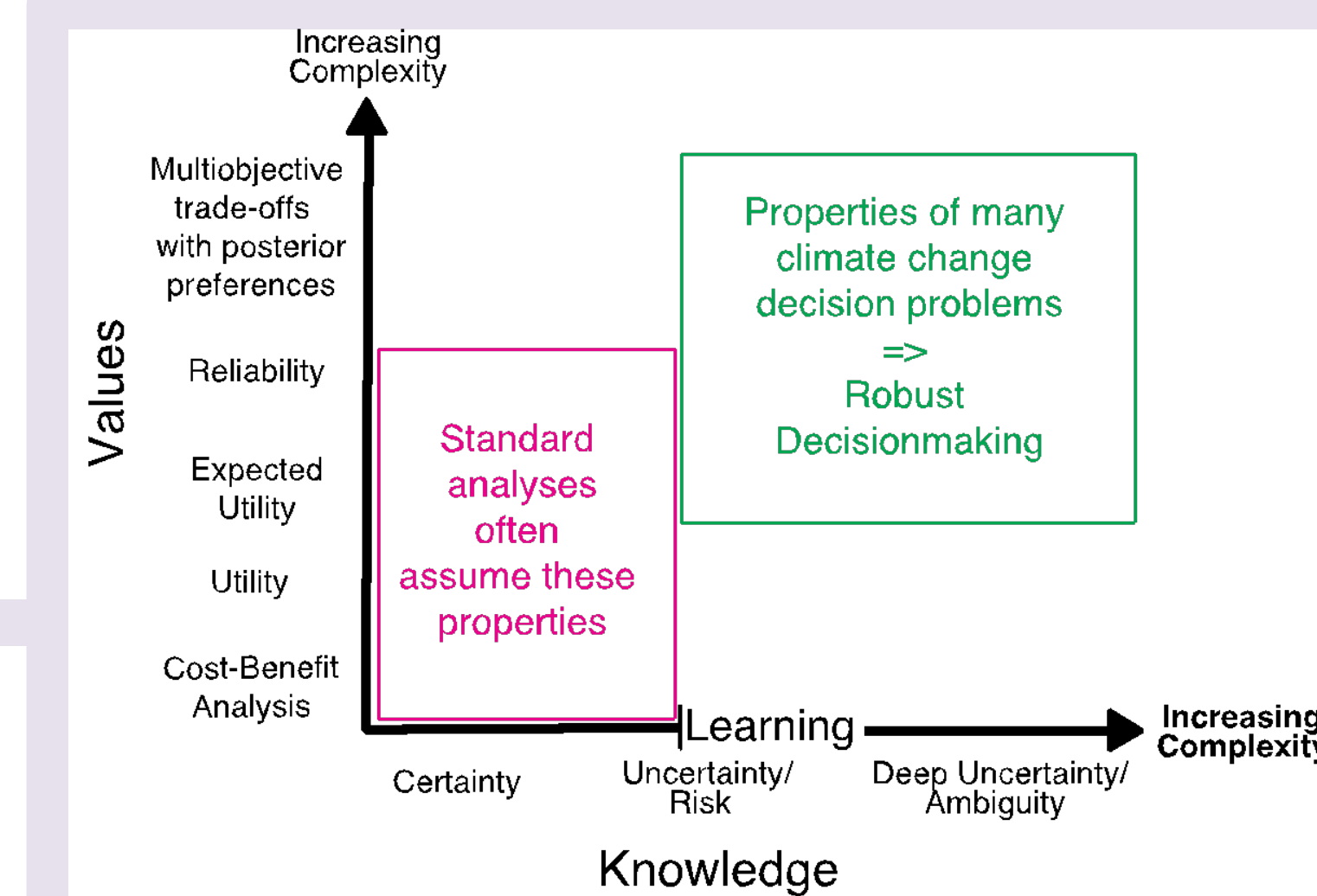
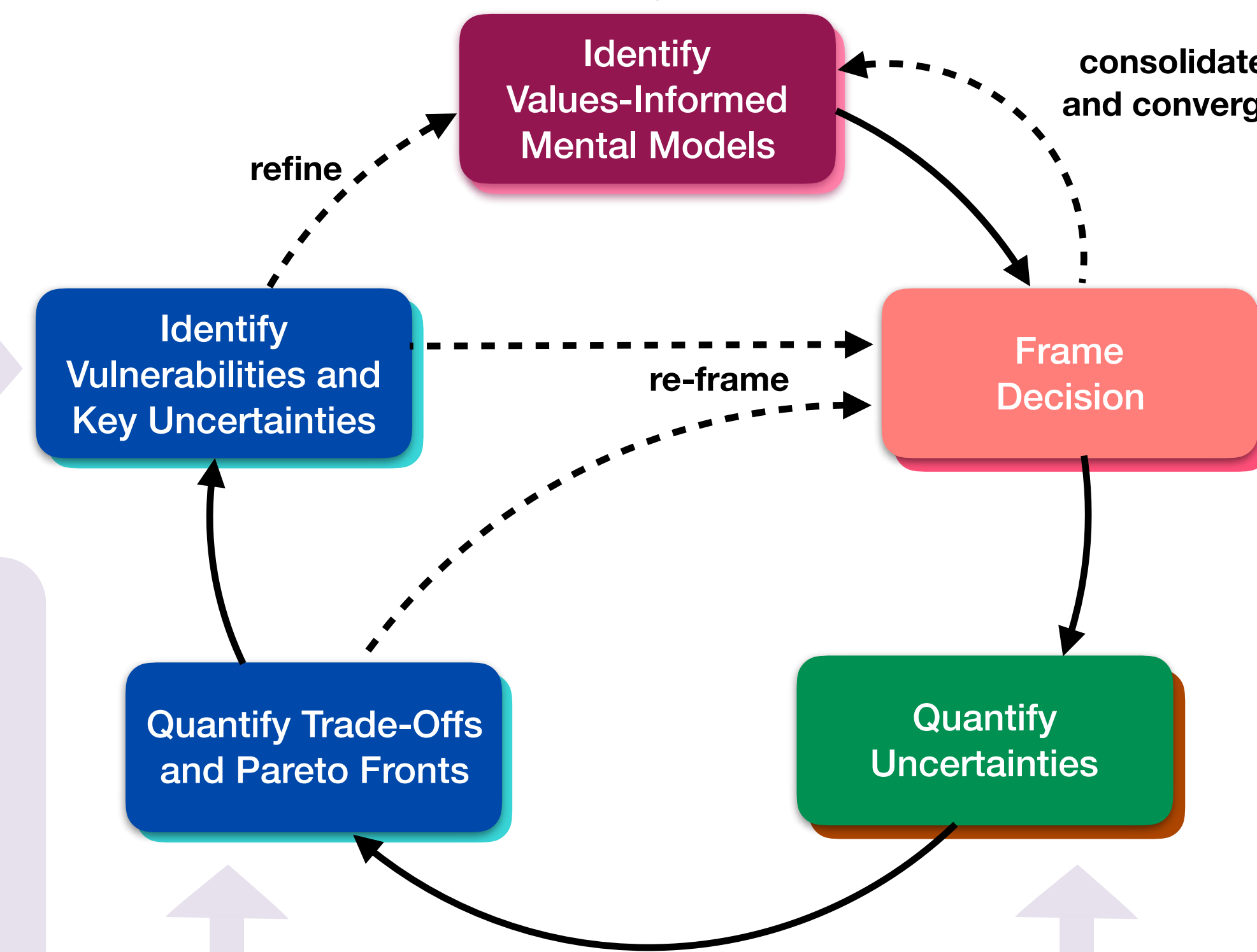
Quantification of the relative importance of key considered uncertainties for projected flood risk over the next few decades. The size of the filled purple nodes represents the total effect of the parameter. The width of the connecting lines represents the importance of parameter interactions. The figure and publication from which it is drawn Wong and Keller (2017) are distributed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) license.



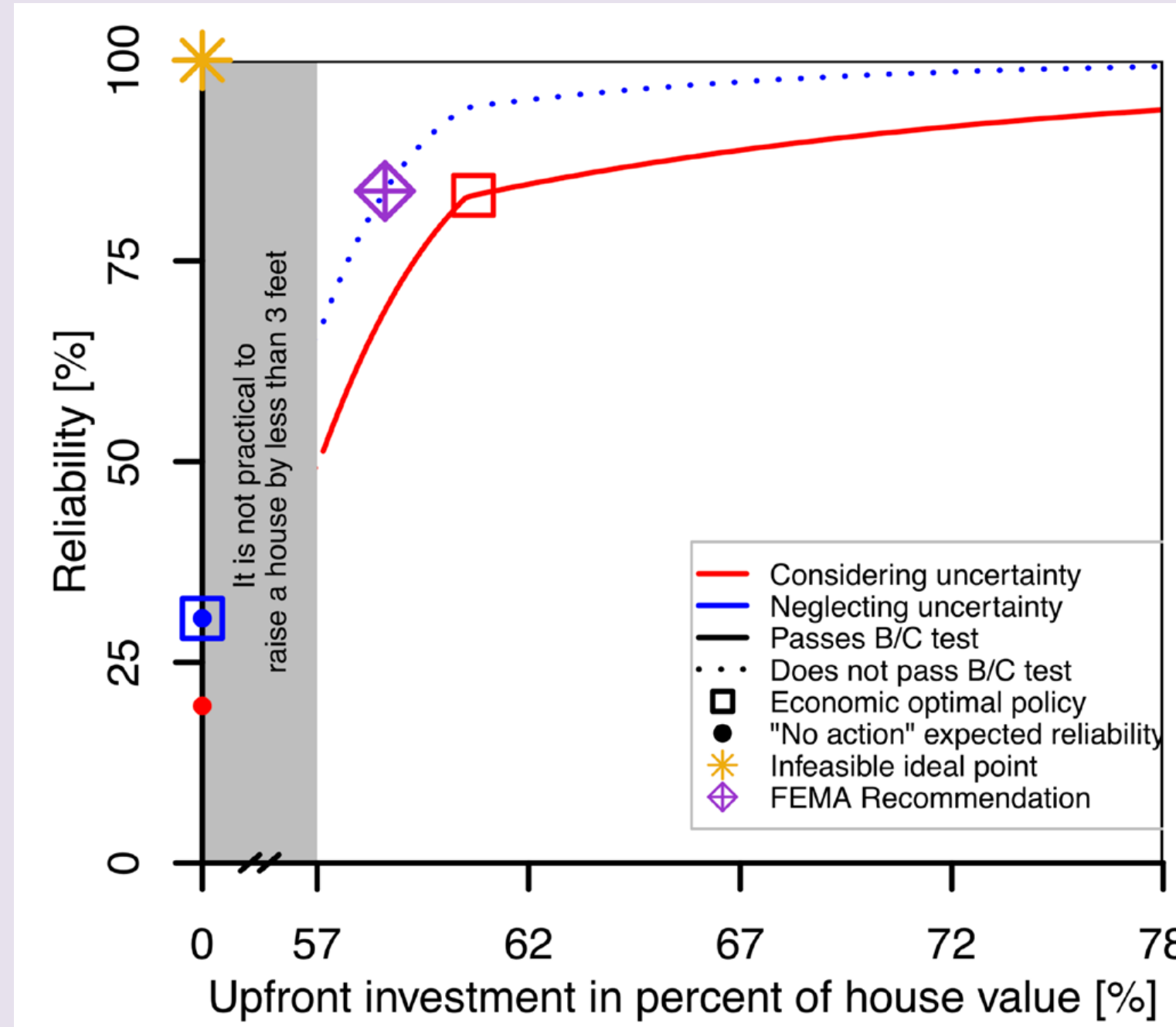
Engaging with stakeholders in New Orleans. Photo courtesy of WPSU / Penn State.



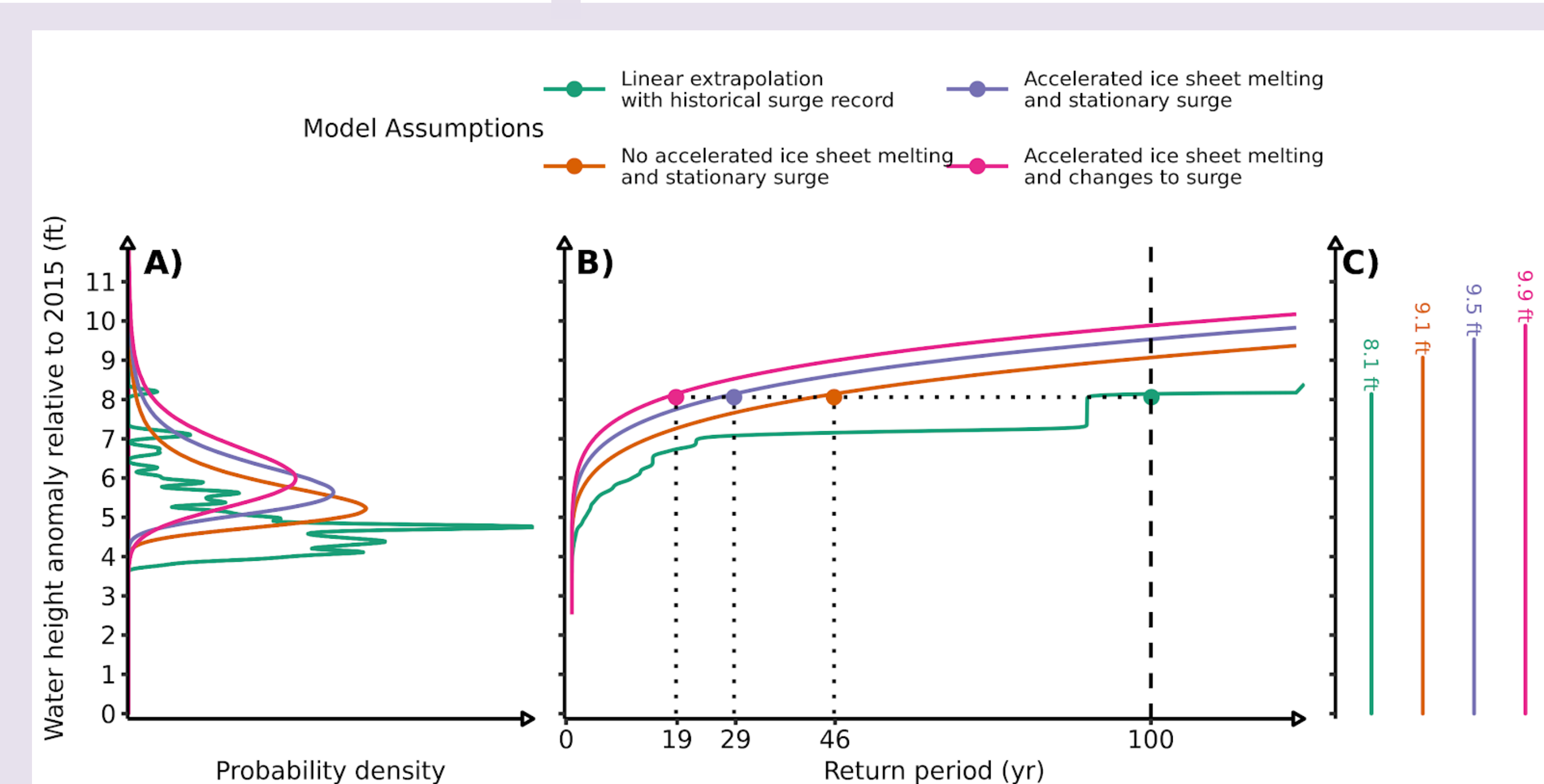
Example of a values-informed mental model representation of coastal climate risk management (synthesizing results from Besette et al. (2017) and Mayer et al. (2017)).



Analyzing and designing climate risk management strategies requires to develop and use methods that are in the appropriate epistemic-ethical location of the decision-problem. Figure modified from Singh et al. (2015).



Trade-offs between the upfront cost and reliability with and without uncertainty quantification. Trade-off under the considering-uncertainty and ignoring-uncertainty assumptions are shown by red and blue, respectively. Along each line, the dashed parts indicate that the policy does not pass the cost-benefit test (i.e. the benefit-to-cost ratio is less than one). Heightening policies of 0-3 feet are blocked by the gray area as we assume that it is impractical to elevate a house b less than three feet. "not elevating" policies are shown by dots and the optimal elevations are shown by squares. Figure from Zarekarizi et al. (2020).



Structural uncertainty can drastically impact projected hazards and risk management strategies. Figure redesigned from Srikrishnan et al. (2019) and distributed under the Creative Commons Attribution 3.0 United States license.

## LEADERSHIP TEAM

**Klaus Keller**  
GEOSCIENCES  
DIRECTOR



**Karen Fisher-Vanden**  
AGRICULTURE

**Murali Haran**  
STATISTICS



**Lisa Iulo**  
ARCHITECTURE

**Robert Nicholas**  
EESI



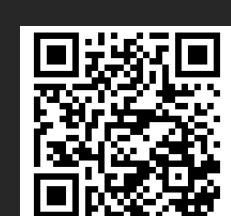
**Wei Peng**  
INTERNATIONAL AFFAIRS  
& CIVIL ENGINEERING

**Janet Swim**  
PSYCHOLOGY



**Nancy Tuana**  
PHILOSOPHY

References and other info:



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