



In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Rider W. Foley

Will defend his dissertation

**Towards Sustainable Anticipatory Governance:
Analyzing and Assessing Nanotechnology Innovation Processes**

Abstract

Cities around the globe struggle with socio-economic disparities, resource inefficiency, environmental contamination, and quality-of-life challenges. Technological innovation, as one prominent approach to problem solving, promises to address these challenges; yet, introducing new technologies, such as nanotechnology, into society and cities has often resulted in negative consequences. Recent research has conceptually linked anticipatory governance and sustainability science: to understand the role of technology in complex problems our societies face; to anticipate negative consequences of technological innovation; and to promote long-term oriented and responsible governance of technologies. This dissertation advances this link conceptually and empirically, focusing on nanotechnology and urban sustainability challenges. The guiding question for this dissertation research is: *How can nanotechnology for urban challenges be innovated sustainably?* The dissertation: analyzes the nanotechnology innovation process from an actor- and activities-oriented perspective (Chapter 2); assesses this innovation process from a comprehensive perspective on sustainable governance (Chapter 3); constructs a small set of future scenarios to consider future implications of different nanotechnology governance models (Chapter 4); and appraises the amenability of sustainability problems to nanotechnological interventions (Chapter 5). The four studies are based on data collected through literature review, document analysis, participant observation, interviews, workshops, and walking audits, as part of process analysis, scenario construction, and technology assessment. Research was conducted in collaboration with representatives from industry, government agencies, and civic organizations. The empirical parts of the four studies focus on Metropolitan Phoenix. Findings suggest that: predefined mandates and economic goals dominate the nanotechnology innovation process; normative responsibilities identified by risk

governance, sustainability-oriented governance, and anticipatory governance are infrequently considered in the nanotechnology innovation process; different governance models will have major impacts on the role and effects of nanotechnology in cities in the future; and nanotechnologies, currently, do not effectively address the root causes of urban sustainability challenges and require complementary solution approaches. This dissertation contributes to the concepts of anticipatory governance and sustainability science on how to constructively guide nanotechnological innovation in order to harvest its positive potential and safeguard against negative consequences.

Tuesday, May, 14, 2013
9:00am
Wrigley Hall, 481

Faculty, students, and the general public are invited.

Supervisory Committee:
Dr. Arnim Wiek (chair)
Dr. David H. Guston
Dr. Thomas Seager
Dr. Ben Minter