SCHOOL of SUSTAINABILITY

ARIZONA STATE UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

Ignacio Fernández

Will defend his prospectus

Urban Ecosystem Services: Understanding their Spatial Dimension for Sustainable Urban Planning

Abstract

Cities are complex socio-ecological systems operating at different spatial scales, and they are also heterogeneous landscapes with distinctive features among themselves. Nevertheless, urban areas may also share some general characteristics that depend strongly on ecosystem services (ES) provided by natural and semi-natural habitats within and beyond the city's boundary. Even though a large proportion of the ES on which cities depend are generated outside the urban boundary, urban green infrastructure within cities provides key ES (e.g. recreation, aesthetics, flood control, microclimate regulation, air filtration) essential for urban sustainability.

Despite the growing evidence that society benefits from ES provided within urban areas, we often lack the empirical data, specific tools, and guiding principles for planning and managing urban landscapes to optimize the provision of ES. Furthermore, because there is often a spatial mismatch between areas that provide ES and areas that require them, the provision of ES within cities is seldom optimally distributed, which can lead to important spatial inequalities in quality of life. Since quality of urban life is tightly coupled with the provision of ES, the development of knowledge and tools to optimize ES provisioning through spatial planning of urban green infrastructure is essential to tackle urban environmental problems, reduce spatial inequalities, and promote sustainable cities.

The main goal of my research is to generate actionable knowledge necessary to help decision-makers to optimize spatial pattern of urban green infrastructure so as to enhance ES provisioning and thus quality of urban life. To achieve this goal I will first investigate the effects of urban landscape patterns on potential ecosystem services provided by urban green infrastructure, focusing on the city of Santiago (Chile). Second, I will analyze the

spatial distribution of three environmental problems of Santiago in order to evaluate how the interactions of these problems affect the spatial inequalities in quality of urban life. Finally, I will use this generated knowledge to develop a green infrastructure allocation methodology for optimizing urban ecosystem services, and demonstrate it through a case study of Santiago.

Monday, January 26, 2015
9:00 a.m.
Life Sciences E-Wing (LSE), Room 704

Faculty, students, and the general public are invited.

Supervisory Committee:

Dr. Jianguo Wu, Chair
Dr. Charles Perrings, Member
Dr. Osvaldo Sala, Member
Dr. Javier Simonetti, Member