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Challenges to interdisciplinary training for junior space, place and health researchers†

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The complexity of research questions posed in space, place and health research has led some researchers to suggest that these questions cannot be addressed adequately through a single research discipline. The objective of this article is two-fold. First, we argue that junior researchers face distinct challenges in learning how to conduct interdisciplinary research. Second, we outline how a unique training experience, the Canadian Institutes of Health Research Space, Place and Health Summer Institute addressed some of the challenges to incorporating interdisciplinarity into this unique field. Interdisciplinary training can prepare the next generation of researchers in all health fields to work effectively with colleagues from various disciplines, ask novel questions and address complex issues in innovative ways.

Keywords: health; space; place; interdisciplinary; graduate training; junior researchers

The complexity of research questions posed in space, place and health (SPH) research has led some to suggest that these questions cannot be addressed adequately through a single research discipline (Plesk 2001, King *et al*. 2002, Srinivasan *et al*. 2003, Curtis and Riva 2009). This is not a problem unique to SPH research. It has been highlighted in the study of social inequalities in health (Graham 2002), life-course epidemiology (Kuh *et al*. 2003) and tobacco research (Nash *et al*. 2003) to name a few. In order to answer complex research questions, thorough insight and integration of theories and methods from different disciplines is required (Scott and Hofmeyer 2007). Interdisciplinarity is a way for researchers to move beyond disciplinary boundaries and to borrow from various disciplines to answer complex questions (Giacomini 2004, Curtis and Riva 2009). The Canadian Institutes of

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Health Research (CIHR) define interdisciplinary work as 'the ability to analyze, synthesize and harmonize links between disciplines into a coordinated and coherent whole' (Canadian Institutes of Health Research 2003). Interdisciplinarity requires researchers to consider expertise from other fields and to work towards a common understanding. This common understanding may limit silo effects whereby researchers are too narrowly focused and may fail to address issues in a comprehensive way, which could improve research impact (Jacobs and Frickel 2009). Interdisciplinary collaboration can also contribute to solve long-standing problems and raising new and innovative research questions (Rosenfield 1992, Kahn and Prager 1994, Stokols *et al*. 2003).

SPH research integrates several distinct research disciplines and has produced excellent examples of where interdisciplinarity adds value to research. For example, research in the field of the built environment and health has involved urban planners, epidemiologists, geographers and social workers to understand how the built environment influences chronic disease and how preventative action can be undertaken (Northridge *et al*. 2003, Srinivasan *et al*. 2003, Lopez and Hynes 2006). With the advent of new methodologies (e.g. multilevel modelling), increased access to tools (e.g. global positioning systems) and data (including genetic information and contextual data), SPH researchers are well-positioned to integrate these seemingly disparate data to address novel interdisciplinary health research problems (Rainhama *et al*. 2010). Nonetheless, while interdisciplinarity in SPH research has expanded greatly over the last decade, interdisciplinary research and training are not free from challenges.

Overcoming disciplinary rigidity, navigating universities' traditional organizational structures, managing quests for autonomy and building confidence in the knowledge and expertise of other disciplines are only some of the challenges facing researchers undertaking interdisciplinary SPH work (Nash *et al*. 2003, Jacobs and Frickel 2009). However, research on the benefits and challenges of interdisciplinarity has typically focused on established researchers (Nash *et al*. 2003, Rhoten and Parker 2004, Rhoten 2005). As junior SPH researchers (i.e. student and post-doctoral fellows), we argue that we experience distinct challenges in learning, conducting and becoming established within an interdisciplinary research field. Our objectives in this article are to (1) outline a unique training experience, the CIHR SPH Summer Institute, a programme to facilitate interdisciplinary training among junior researchers and (2) present our perspective on challenges to 'doing interdisciplinarity' faced by junior researchers.

CIHR SPH Summer Institute

The CIHR held an SPH Summer Institute July 9–11, 2009 at McMaster University in Hamilton, Ontario, Canada. This intensive, three-day strategic capacity-building institute was funded by the CIHR's Institute of Health Services and Policy Research (IHSPR) and Institute of Population and Public Health (IPPH). Led by Dr James Dunn (CIHR Chair in Applied Public Health), the Institute brought together 26 leading graduate students and post-doctoral fellows, and 10 internationally renowned academics in SPH research.

The CIHR solicited applications from various disciplines and over 40 junior researchers applied to fill 26 available positions. All successful applicants were

enrolled in doctoral studies or held post-doctoral fellowships in SPH and a majority held CIHR training awards. Participants represented 12 different Canadian academic institutions located in the provinces of British Columbia, Alberta, Ontario, Quebec and Nova Scotia. A variety of faculties and departments were represented, including population and public health, geography, environmental science, epidemiology, nursing, health promotion, community health sciences, rehabilitation science and urban design.

Ten established researchers with SPH expertise representing Canada, the United States and the United Kingdom acted as mentors and shared their knowledge and experience with junior researchers. The curriculum (Table 1) was purposefully designed to expose participants to different methodologies and international/cross-cultural applications of SPH research. The SPH Summer Institute included two plenary presentations, three panel sessions, respectively focusing on state of the art geographic methods and analytic techniques, knowledge translation and applied research across policy and practice settings; and, the choice between a laboratory session or field trips. The laboratory session provided junior researchers with hands-on opportunities with ArcGIS computer software. Field trips included measuring health-related attributes in two neighbourhoods using a systematic observation tool or a visit to a health clinic that serves the homeless to learn about field service delivery. Finally, a group activity involved developing and presenting a proposal for an interdisciplinary research project with the objective of solving an important issue in SPH.

Overall, the objective of the Summer Institute (or Space Camp as it was dubbed by participants) was to 'foster the creation and maintenance of complex interdisciplinary research teams and their community/policy-maker/practitioner partners' (Canadian Institutes of Health Research 2009). In our opinion, Space Camp was a unique opportunity for junior SPH researchers to learn about what interdisciplinary work entails and the skills required to participate, and excel, in this type of research. To make this case, we outline four challenges to learning and conducting interdisciplinary research and highlight how Space Camp was an important step in addressing these challenges.

Challenges to interdisciplinarity

The first challenge to interdisciplinarity faced by junior researchers is the potential risks to future career development (Nash *et al*. 2003, Rhoten 2005). While some universities are attempting to cultivate interdisciplinarity through research consortia (Jacobs and Frickel 2009), and training programmes, such as the Bridge program at the University of British Columbia that links health, engineering and policy research to address public health challenges (http://www.bridge.ubc.ca/), interdisciplinary research is still marginalized in academics (Jacobs and Frickel 2009). Junior researchers tend to choose monodisciplinary departments such as epidemiology or geography rather than interdisciplinary departments because they are more likely to identify the costs of interdisciplinary research to their future career (Rhoten and Parker 2004, Rhoten 2005). Junior researchers perceive more career constraints to interdisciplinarity than established researchers because disciplinary theory and methods are still the standard in peer evaluation (Mallard *et al*. 2009). As a result, junior researchers are required to be experts in a discipline in order to successfully

Table 1. CIHR SPH Summer Institute curriculum.

	Activity	Speaker
Day 1		
18:00–18:30	Welcome reception	James Dunn (McMaster University)
18:30–21:00	Diner and keynote	Roger Ulrich (Texas A&M Univeristy)
Day 2		
9:00–10:00	Opening plenary	James Dunn
10:00–10:20	Break and discussion	
10:20–11:30	Panel: Leading edge in SPH research	Dionne Gesink-law (University of Toronto) Gavin Andrews (McMaster University) Yan Kestens (Université de Montréal) Candace Nykiforuk (University of Alberta)
11:30–11:50	Break and discussion	
11:50–13:00	Panel: Knowledge translation in SPH research	Anita Kothari (University of Western Ontario) Gillian Booth (St. Michael's Hospital) Joan Canavan (Ontario Ministry of Health) James Dunn (McMaster University) Teresa Ho (Region of Peel)
13:00–14:00	Group project	
14:30–17:30	Field trip/Lab	Lab: Spatial analysis and health information Field trip A: Homelessness, place and delivery of health care Field trip B: Systematic social observations of neighborhood attributes and health
17:30–18:30	Free time	
18:30–21:15	Diner and keynote	Mei-Po Kwan (Ohio State University)
Day 3		
9:00–10:30	Group project	
10:30–11:00	Break and discussion	
11:00–12:30	Panel: International and cross-cultural examples	Chantelle Richmond (University of Western Ontario) Mai Stafford (University College London) Steve Cummins (Queen Mary University London) Issac Luginaah (University of Western Ontario)
12:30–14:30	Group project	
15:00–17:30	Boat cruise	
18:00–19:30	Group project	
Day 4		
9:00–12:45	Group presentations	

apply for grants and publish findings (Rosenfield 1992, Nash *et al*. 2003). Junior researchers are acutely aware of 'the tension between the scientific promise of the interdisciplinary path and the academic prospect of the tenure track' (Rhoten and Parker 2004, p. 2046). Space Camp allowed junior researchers to interact with

professors who are successful in obtaining grants and publishing interdisciplinary work in SPH. For example, one of the mentors, Dr Steven Cummins recently received a £916,803 grant to evaluate the Healthy Towns initiative in the United Kingdom (http://www.geog.qmul.ac.uk/newsevents/news/18928.html). This project combines geography, health and urban studies to evaluate a large scale programme initiated by the UK government.

The second challenge for interdisciplinarity is that 'bright young scientists will gravitate towards the rich scientific opportunities at disciplinary boundaries' (Sung *et al*. 2003, p. 1485). However, as junior researchers progress in interdisciplinary fields, they recognize that there is little interaction between those enrolled in root disciplines and those from interdisciplinary programmes. Junior researchers may be getting caught in 'interdisciplinary silos'. For example, public health researchers may conduct a considerable amount of geographic research, but rarely interact with geographers and often do not root their work in core geographic principles (Kearns and Moon 2002). The CIHR SPH Summer Institute allowed participants to get out of their interdisciplinary silos, return to disciplinary roots and be exposed to new disciplines for the first time. Junior researchers from interdisciplinary programmes were challenged to integrate the theories, methods and assumptions of the many disciplines, such as epidemiology, geography and sociology when groups of three to five participants were tasked with designing (in only a few hours) innovative research projects in SPH. Projects developed included a longitudinal study of the relationship between mixed-land use and health in a newly developed area of Toronto and the impact of introducing a rapid transit line in the Metro Vancouver Region on behavioural and social pathways to health (http://www.cihr.ca/e/41330.html).

The third challenge faced by junior SPH researchers pertains to the fact that some supervisors may be ill equipped to teach interdisciplinarity (Nash *et al*. 2003, Szostak 2007). This is due to their training within a specific discipline or to the lack of resources facilitating interdisciplinary training within departments or research faculties (Szostak 2007). However, we believe supervisors can encourage interdisciplinarity through committee member selection, course and comprehensive exam requirements and by supporting the enquiry of theoretical frameworks, methods and tools of various disciplines. Space Camp exposed students to a participatory model for teaching interdisciplinarity. The format did not follow a traditional academic structure of didactic lectures. Rather it encouraged discussion, debate and collaboration. Mentors facilitating the camp challenged students to reconsider their assumptions and to critically assess new perspectives on contemporary issues. Exposure to a similar model for teaching interdisciplinarity can help junior researchers seek out new training opportunities within and outside their universities and develop innovative ways to learn interdisciplinarity.

Finally, junior researchers are limited by considerable financial and time constraints in their opportunities to be exposed to interdisciplinarity. The pressure of comprehensive exams, publications and dissertation writing limit participation in training initiatives. However, if we are to have the 'ability to analyze, synthesize and harmonize links between disciplines' (Canadian Institutes of Health Research 2003) there must be opportunities to understand the languages and basic concepts of different disciplines. Discussions at Space Camp quickly became frustrating without a common language for basic concepts central to SPH research. For example, understanding that interaction, effect modification and moderation have the same meaning depending on discipline neatly underscored the importance of

communication between researchers and of building confidence in others' expertise. As junior researchers, we believe this is the key to engaging in constructive interdisciplinary research teams. One way forward is to encourage and facilitate junior researchers' participation to intensive but well-structured interdisciplinary initiatives, such as Space Camp.

Conclusion

Interdisciplinary research is recognized as an approach that will help us answer complex questions in SPH research. However, junior researchers face unique challenges to learning and conducting interdisciplinary research. Strategic training, such as the CIHR SPH Summer Institute, is a forward-looking step to teaching junior researchers interdisciplinarity. It can prepare the next generation of SPH researchers to work effectively with colleagues from various disciplines, ask novel questions and address complex issues in innovative ways. By encouraging participation from students and mentors who identified with a diversity of disciplines, the CIHR SPH Summer Institute was a unique opportunity to expose students to interdisciplinarity research in this field. This article is one example of how Space Camp successfully promoted the exchange of ideas and the creation of future interdisciplinary collaborations.

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