

## **i. International Coordination**

### **i.1 International Experiences: Research Internships**

If we receive additional funds to support international activities, we will expect every IGERT Fellow to visit a cognate research group in another country for a period of at least four months, in order to give them in-depth experience with international variations in research infrastructure and culture and to make professional contacts outside the United States. We will concentrate our IGERT Fellows' international internships at three sites, one for each major component of our major research efforts. Most students in basic geographic information science will be directed to the Institute for Geoinformatics at the University of Münster, Germany. Geographic environmental science trainees will be encouraged to go to the International Institute for Geo-Information Science and Earth Observation in Enschede, Netherlands. And geographic social science specialists will normally complete their international research internships at the Centre for Advanced Spatial Analysis at University College, University of London, England. In all three of these programs, instruction and research discussions are in English, reducing the need for language training for the IGERT fellows. The University at Buffalo's Study Abroad Office will provide students with information and assistance with issues involved in relocation overseas for several months.

Buffalo faculty have strong histories of research collaboration with scholars at these sites, and we are confident that the IGERT Fellows will receive strong research exposure and mentoring. Concentrating our trainees at a small number of sites also will allow them to become experienced with hosting our IGERT Fellows. We also will allow trainees to apply to spend their international research internships at other sites more closely related to their research, to be approved by the IGERT Steering Committee on a case by case basis. Lastly, we will leverage our experience with international research internships by coordinating and supporting a few such interns each year from other US institutions. We plan to support about nine international research interns each year, about six from our IGERT program plus three additional US Ph.D. students from other institutions.

#### **i.1.1 Institute for Geoinformatics, Münster, Germany**

The Institute for Geoinformatics at the University of Münster will be primary international research internship site for our IGERT trainees specializing in basic geographic information science. Professor Werner Kuhn will be coordinating the activities of IGERT trainees at Münster. The Institute for Geoinformatics was established in 1994, and three professors, three research fellows, and two office staff form the basic personnel of the Institute. In addition, 19 research fellows and 40 undergraduate assistants are working in several research and development projects. The faculty include computer scientists, mathematicians, and researchers from landscape ecology and geography. Research projects of the Institute include: construction of knowledge-based systems; mobile systems for the acquisition of spatial data and interconnection with GPS; infrastructures for geoinformation; mobile geoinformatics; spatial (meta) databanks; conception and realization; application, advancement and software development for spatial interpolation methods; visualization and multimedia in earth sciences; and climate models.

#### **i.1.2 International Institute for Geo-Information Science and Earth Observation (ITC), Enschede, Netherlands**

The International Institute for Geo-Information Science and Earth Observation in Enschede, Netherlands, widely known as the 'ITC', has a very long and distinguished record of education and training of graduate students from all over the world. The ITC will be the primary international site for IGERT students in our Geographic Environmental Science cluster, and the contact at the ITC for our internship program will be Prof. Chris Mannaert of the Department of Water Resources. That department ITC's focal point for expertise in water resources and water related environmental studies, concentrating on six, interrelated knowledge nodes: water resources analysis and

management; satellite hydrology and its application in agricultural production systems; groundwater management; environmental hydrology; geo-information for coastal zone management; and information systems for integrated water management. The research and development activities concentrate on earth observation and geo-information science therefore strong linkages exist with themes concerning satellite platforms and sensors and GIS technology.

### **i.1.3 Centre for Advanced Spatial Analysis (CASA), London, United Kingdom**

The Centre for Advanced Spatial Analysis (CASA), at University College, University of London, is an ideal site for our IGERT Fellows concentrating in Geographic Social Science. CASA's mission is to develop emerging computer technologies in disciplines that deal with geography, space, location, and the built environment. CASA is run by J. Michael Batty, Professor of Spatial Analysis and Planning, who was Director of the NCGIA at Buffalo from 1990 to 1995. The kinds of computation involved at CASA cover geographic information systems (GIS), computer-aided architectural design, spatial analysis and simulation, and methodologies for planning and decision support. Projects range from basic research to applied consulting and policy advice to local municipalities and the private sector. As a Research Centre within one of the UK's oldest universities, CASA provides expertise in IT based spatial decision systems and spatial analysis. Within the Centre, expertise is drawn from archaeology, architecture, cartography, computer science, environmental science, geography, planning, remote sensing, geomatic engineering, and transport studies.

### **i.2 International Experiences: Vespucci Summer Schools**

The establishment of professional contacts with researchers in other countries is an important element of the internationalization of US science and engineering professionals. In order to provide our IGERT trainees with such contacts early in their careers, we will co-organize an annual International Summer Institute in GIScience for early-career researchers. The highly-successful NSF-sponsored summer institutes held in Wolf's Neck, Maine (Craglia and Couclelis, 1997) and in Berlin, Germany (Craglia and Onsrud, 1998), organized by the US National Center for Geographic Information and Analysis (NCGIA) and the European Science Foundation's GISDATA project, provide the model for this activity.

We are fortunate that an international group of European colleagues, most of whom had been involved in the GISDATA initiative, recently announced the establishment of an annual GIScience Summer School, to be held in Pratolino (Italy) under the sponsorship of The Vespucci Initiative (<http://www.vespucci.org>). Max Craglia, chief European organizer of the Wolf's Neck and Berlin institutes, is a key member of the Vespucci group. If we receive supplementary funds from NSF to support international activities, we will send 12 US Doctoral students or early-career scholars in GIScience to the Vespucci Summer School each year of the award. Each year, about half of this US delegation will be Buffalo IGERT Trainees, and the other half will be US citizens or permanent residents from other US institutions, selected from a national competition. We will offer the opportunity to our current trainees and other US GIScience Doctoral students beginning in Summer 2004; each Buffalo GIScience IGERT trainee who enters our program in 2004 or later will be required to attend one of these International Summer Institutes.

Our IGERT program will pay the Vespucci Summer School registration fees for these students, as well as their cost of travel to the site and their living expenses during the Summer School. In return, the Vespucci organizers will co-organize with us some IGERT-specific activities within their Summer School framework. A small group of established GIScience scholars from the United States will work with the Vespucci organizers to plan and conducted specific activities for US and European early-career scholars in parallel with the Vespucci Summer School courses. The Summer Institutes will include research presentations by early-career scholars, and collaborative and team-building experiences such as proposal-writing contests.