

Oregon State University ESRI Development Center (EDC) Application

<http://www.esri.com/industries/university/edc>

June 2008

1. Name of Institution: Oregon State University

2. Full Mailing Address

Department of Geosciences
c/o Dawn J. Wright
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3. EDC Program Coordinator

Dawn J. Wright
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4. EDC Tech Support Contact

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5. Full Shipping Address for EDC Materials

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6. List of Faculty Participating in EDC

Core EDC Faculty

Geosciences:

Dawn J. Wright, Professor; GIS, marine and coastal geography, mid-ocean ridges, geography of cyberspace; dawn@dusk.geo.orst.edu

Dawn Wright is professor of Geography and Oceanography, and the director of the Davey Jones' Locker Seafloor Mapping/Marine GIS Laboratory. She is also the primary liaison for Oregon State University's ESRI site license. Her research interests include geographic information science, marine geography, tectonics of mid ocean ridges, and the processing and interpretation of high-resolution bathymetric, video, and underwater photographic images. Dawn serves on the editorial boards of the *International Journal of Geographical Information Science*, *The Professional*

Geographer, *Transactions in GIS*, and *Geospatial Solutions*, and is currently a member of the National Academy of Sciences' Strategic Directions for Geographical Sciences in the Next Decade. Her books include *Marine and Coastal Geographical Information Systems* (Taylor & Francis, 2000), *Undersea with GIS* (ESRI Press, 2002), and *Arc Marine: GIS for a Blue Planet* (ESRI Press, 2007). She holds degrees from UC-Santa Barbara (Ph.D. in Physical Geography and Marine Geology), Texas A&M (M.S., Oceanography), and Wheaton College in Illinois (B.S., Geology).

OSU Libraries: **Janine Salwasser**, OSU Natural Resources Digital Library Program Director; janine.salwasser@oregonstate.edu
 In her role as Natural Resources Digital Library program director for OSU libraries, Janine co-manages the development of the Oregon Explorer portal (<http://www.oregonexplorer.info>) with Jimmy Kagan of the Institute for Natural Resources. Her research and professional interests include user needs assessments, usability evaluations, and community outreach. Janine received her M.S. in Wildland Resource Science from UC Berkeley and her B.A. in Geography from UC Santa Barbara.

Forest Engineering: **Michael G. Wing**, Associate Professor Senior Research; spatial applications and environmental research, stream habitat, visibility analysis, GIS, remote sensing, spatial statistics; Michael.Wing@oregonstate.edu
 Michael Wing is Associate Professor of GIS and Spatial Analysis, as well as a certified Professional Engineer, Professional Land Surveyor, and Water Rights Examiner. He has taught over 40 GIS and GPS 2-3 day workshops through the extended education program at Oregon State University's College of Forestry over the past six years. These workshops are designed for working professionals who want to learn, reinforce, or improve their GIS and GPS working knowledge. Current offerings include introductory and advanced GIS Applications in Natural Resources with ArcGIS. His books include *Geographic Information Systems: Applications in Forestry and Natural Resource Management* (Mc-Graw Hill). Michael received his PhD from Oregon State University.

Other Participating EDC Faculty and Staff

Bobbitt, Andra, Senior Faculty Research Assistant/GIS Specialist, NOAA Vents Group, OSU Hatfield Marine Science Center, Andra.Bobbitt@noaa.gov
Bolte, John P., Associate Professor, Department of Biological & Ecological Engineering; PhD, Auburn University; mathematical modeling and simulation of agricultural, aquacultural and environmental systems, GIS-based spatial modeling, artificial intelligence applications in bioresource management, boltej@enr.orst.edu
Carmichael, Kelly, Research Associate, Forestry Sciences Lab, http://wwwdata.forestry.oregonstate.edu/personnel/Mailform.aspx?E_No=7207
Daly, Chris, Professor Senior Research, Department of Geosciences and Associate Director, Northwest Alliance for Computational Science & Engineering; PhD, Oregon State University; climatology, meteorology, author of the PRISM climate parameter expert system, daly@nacse.org
Follett, Tomas, Faculty Research Assistant/Database Manager, OSU Marine Mammal Institute, tomas.follett@oregonstate.edu
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Guzy, Michael, Assistant Professor Senior Research, Department of Biological & Ecological Engineering; PhD, UC-Riverside, GIS for simulation, statistical, and mathematical modeling of biophysical systems and their interactions with social processes, guzym@enr.orst.edu
Haggerty, Patti, Research Associate, Forestry Sciences Lab, http://wwwdata.forestry.oregonstate.edu/personnel/Mailform.aspx?E_No=7465
Hannaway, David, Professor, Department of Crop and Soil Science; PhD, University of Kentucky; forage crops, GIS-based mapping technologies for climate, soils, and species characteristics, david.hannaway@oregonstate.edu

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Minoura, Toshi, Associate Professor, Computer Science; PhD, Stanford University; GIS, web GIS, distributed interactive software, distributed structural active-object systems, minoura@cs.orst.edu
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Pancake, Cherri, Professor and Intel Faculty Fellow, Computer Science and Director of Northwest Alliance for Computational Science and Engineering; PhD, Auburn University; usability engineering, parallel processing, user interfaces, distributed databases and computing, pancake@nacse.org
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Walsh, Kuuipo, Institute for Natural Resources, kuuipo.walsh-at-oregonstate.edu
Weiss, Andy, Faculty Research Assistant/GIS Developer, OSU Marine Mammal Institute, andrew.weiss@oregonstate.edu
Yang, Zhiqiang, Research Associate, Department of Forest Engineering, zhiqiang.yang@oregonstate.edu
Zhang, Eugene, Assistant Professor, Computer Science; PhD, Georgia Tech, computer graphics, scientific visualization, computational geometry and topology, zhange@eecs.oregonstate.edu

7. Short Description of Facilities Available to EDC

The EDC will be managed with existing support staff and administrative resources in the Department of Geosciences at Oregon State University. A full listing of GIS and geospatial technology facilities is available at <http://geo.oregonstate.edu/ucgis/facilities.html> with descriptions of our GIScience research labs in the Colleges of Science, Forestry, Agriculture, Engineering, and Oceanic & Atmospheric Science, as well as instructional facilities throughout the entire campus.

8. Number of Students Currently in GIS-related Programs

We currently service 40-60 students in both the undergraduate and graduate GIScience certificate programs on an annual basis, as well as the hundreds of students who annually enroll in selected GIScience courses for their degrees programs, career development, or general interest and skill-building. Students come mainly from Geosciences, Forest Engineering, Forest Science, Forest Resources, Water

Resources Science, Water Resources Policy and Management, Water Resources Engineering, Biological and Ecological Engineering, Computer Science, Horticulture, Agricultural and Resource Economics, and Crop and Soil Science, as well as the College of Oceanic and Atmospheric Sciences. Hence, student participants in the EDC will be drawn from this pool.

9. Description of Course Offerings Related to GIS and Geospatial Technologies

Oregon State offers basic-, intermediate-, and advanced-level coursework in geographic information science (particularly GIS, cartography, remote sensing, and surveying/geomatics). The basic courses have been structured so that students may enroll in each after fulfilling a minimum number of prerequisites. These basic courses in turn, are the major prerequisites for the intermediate- and advanced-level courses that follow. Most courses can be combined into an *interdisciplinary* undergraduate or graduate **certificate** in geographic information science (<http://geo.oregonstate.edu/gcert>). The majority of these courses rely on ESRI software, and several of them integrate GIS and information technology concepts that allow students to create, design or test applications or extensions of ESRI desktop or server products. The breadth of these courses and the cooperation among departments and colleges provide interested students with a unique opportunity for personal enrichment. Oregon State's undergraduate and graduate certificate offerings are distinct in that they go beyond GIS to require or include coursework in cartography, remote sensing, and surveying/geomatics, with additional multidisciplinary experience drawing on forestry, geography, landscape ecology, horticulture, oceanography, atmospheric sciences, soil sciences, and hydrology.

Learning outcomes for the GIS and geospatial technology courses include:

- Demonstrated skill in integrative spatial thinking and effective implementation of various spatial analysis methods, as well as collaborative learning across several sub-disciplines within the GIScience field.
- Solid grounding in GIScience technology and the appropriate application of that technology (software, data collection instruments and devices).
- Familiarity with a wide variety of research applications, management and decision-support scenarios, with the capacity to apply knowledge to natural resource problems at a variety of spatial and temporal scales.

See a full listing of courses at:

<http://www.geo.orst.edu/ucgis/teaching.html> or

<http://www.geo.oregonstate.edu/gcert/>

10. Letters of Approval/Commitment from University Administrators

Please see the letters attached at the end.

11. Letter of Support from the ESRI Site License Administrator

This application was prepared by Dawn Wright, Oregon State's ESRI Site License Administrator, and is therefore already indicative of her full support. She also solicited the letters of support in item 10, and, if the application is approved by ESRI, will fold EDC program coordination into her existing duties as ESRI Site License Administrator. Wright pledges to send in to ESRI a 500-word annual report about the EDC program on campus, including the name and mailing address of the Oregon State student to receive the Student of the Year award, and will renew Oregon State's EDC on a 3-year cycle by updating the information included in this initial application.



Dawn J. Wright

12. Rationale for an EDC at Oregon State University

OSU has had a long tradition of excellence in GIS research and technology development coupled with excellence in the earth sciences, natural resource management, and land boundary delimitation. Contributing units now include Geosciences, Fisheries & Wildlife, Forest Engineering, Forest Science, Forest Resources, Civil & Construction Engineering, Biological & Ecological Engineering, Computer Science, Horticulture, the Institute for Natural Resources, Agricultural and Resource Economics, and Crop and Soil Science, as well as the College of Oceanic and Atmospheric Sciences and the OSU Libraries. It is the view of many professionals within the GIScience community that the time has come to synthesize, articulate, and put into appropriate intellectual context the recent advances of this research (e.g., Marble et al., 2003), which includes continued opportunities for students to design and develop GIS applications. We currently have strong inclusion of ESRI's ArcGIS desktop software and extensions in this effort, but are seeking now to extend this to server technology and to object-based and script programming. To wit, Oregon State University is gradually increasing ESRI server, portal toolkit use and associated code development, for example:

- Use of ArcGIS Server and ArcSDE (SQLServer) server for research projects in Biological & Ecological Engineering, including the development of .Net ADF and Python geoprocessing scripts and web services, as well as some development in ArcObjects.
- Installation and use of ArcGIS Server in the College of Forestry, with ArcIMS and ArcSDE in enterprise mode.
- Use of ArcIMS 9.x for small research projects and ArcSDE 9.x as a teaching tool (in GEO 465/565, Geographic Information Systems and Science) in Geosciences, with the need to migrate to ArcGIS Server.
- Installation and production mode usage of GIS Portal Toolkit in the College of Oceanic and Atmospheric Sciences, as well as a test installation in the OSU Libraries. The OSU Libraries' implementation of ArcIMS for the Oregon Imagery Explorer (<http://www.oregonexplorer.info/imagery>) was named Web Site of the Month (March 2008) by the Open Geospatial Consortium. This site was developed in collaboration with the Oregon Department of Administrative Services' Geospatial Enterprise Office), and serves up 0.5-m orthoimagery of the entire state of Oregon. Transition to ArcGIS server for vector file integration is planned.
- Coding (in Visual Basic), public release, and marketing of the Benthic Terrain Modeler 1.0, an ArcGIS desktop extension developed by the Davey Jones Locker Marine GIS Lab in collaboration with the NOAA Coastal Services Center and formally adopted by 15 research labs worldwide. We want to migrate this to Python for ArcGIS ModelBuilder.

Hence, this is an excellent opportunity for Oregon State to establish an EDC, which will allow us to expand on the above work and also to reinvigorate our existing Geoprocessing/Geoprogramming Work Group within the College of Forestry. Our **plans for the EDC include:**

- Monthly EDC user group meetings (maybe as part of the existing Forestry Spatial Data Management group, <http://www.fsl.orst.edu/sdmg>) including brown-bag seminar series on applications and server development, and associated tips and tricks led by collaborators across campus or off-campus. As an example, we may invite John Sharrard of ESRI-Olympia or representatives of the Oregon Geospatial Enterprise Office (our state service center for GIS), the Oregon Geographic Information Council (established by executive order of the governor and consisting of Directors, Deputy Directors, or policy level alternates for 21 state agencies, 2 federal representatives and 4 local governments), or Women in GIS (based in Portland but served by a discussion board hosted by Oregon State University). The group meetings and brown-bag seminars should provide useful fodder for project collaboration, new internship opportunities for students, and modules to use in course work.

- Use the additional ESRI Developer Network (EDN) program seat in existing courses such as GEO 580 (Advanced GIS in the Geosciences), CS 549 (Selected Topics in Information Systems), CS/CSS/ECE/FOR/FS/GEO/HORT 410 (undergraduate internship in Computer Science, Crop & Soil Science, Electrical Engineering, Forest Resources, Forest Science, Geosciences, or Horticulture), GEO/FOR/FS 510 (graduate internship in Geosciences, Forest Resources, or Forest Sciences), or in a new course in development on GIS programming. The EDN seat may also be used in funded research projects and contracts such as Oregon State University's recent natural resources digital library and web portal development as contracted by the state of Oregon Watershed Enhancement Board, the Oregon Department of Administrative Services and other state agencies (for example, see http://inr.oregonstate.edu/oregon_explorer.html). EDN resources may also be used in our Ecosystem Informatics doctoral IGERT program (Integrative Graduate Education and Research Traineeship). This doctoral fellowship and graduate minor program integrates ecosystem science, computer science, and mathematics and is funded by the National Science Foundation (see <http://ecoinformatics.oregonstate.edu>).
- sending the EDC program coordinator and one other EDC faculty/staff member or student to an ESRI instructor-led course and to the ESRI Developer Summit. The participants must report back to the Oregon State EDC community by way of a seminar presentation.
- consider annual nominations for establish an annual A Student of the Year award certificate for an outstanding student in the EDC program based on outstanding work in developing or designing GIS applications as part of a graduate research assistantship, course project work, or internship work.
- Expand upon advanced level workshops or courses that provide education and training in the development of GIS tools, applications, and workflows using ESRI platform.

Planned promotion for the center includes:

- Advertising the emergence and opportunities for the center in our courses, including course project work incorporating the development of GIS tools, applications, and workflows using ESRI platform.
- Encouraging internship work incorporating server technologies. For instance, several of our students have served in the past as paid or volunteer interns with the City of Corvallis GIS group within their Department of Public Works.
- Give presentations about the new EDC to the Willamette Valley GIS User Group (administered by the Willamette Valley Council of Governments: Marion, Polk, Yamhill Counties; 31 cities; 9 special districts; and the Confederated Tribes of the Grande Rhonde Community).
- Work with University Advancement on a press release about the new EDC. University press releases normally go to local and statewide news outlets.

GIScience faculty members at OSU have for many years collaborated with many agencies and organizations that have expressed service-area employment needs in GIScience (particularly for GIS and remote sensing specialists and interns), which has also been extremely important to the state economy. (again an important tie-in to EDC collaborative work and internships for students). These include the Oregon Department of Transportation (which has visited our GIS Day activities in order to plant the seeds for paid internship arrangement for our students), the Department of Administrative Services, the Department of Land Conservation and Development, the Oregon Department of Fish and Wildlife, and the Department of Environmental Quality; consulting firms and technology companies such as Alsea Geospatial (Corvallis), Corvallis Microtechnology, Titan Industries (Portland), and ESRI (Pacific Northwest to worldwide). There is a need in these agencies/companies for individuals who can “think spatially” and use GIScience technology effectively, especially in order to understand the complexity of natural resource systems and/or to assess impacts of current and planned practices (e.g., URISA, 2003). Oregon's continued leadership in GIScience (e.g., OSU was one of the founding members of the University Consortium for Geographic Information Science or UCGIS) will require individuals with the knowledge, experiences, and network contacts gained by participation in an EDC.

References

- Marble, D. and Task Force on the Development of Model Undergraduate Curricula, 2003, *Development of Model Undergraduate Curricula for Geographic Information Science and Technology: The Strawman Report*, McLean, VA, University Consortium for Geographic Information Science, 89 pp., www.ucgis.org.
- Urban Regional Information Systems Association, 2003, *Salary Survey for IT/GIS Professionals*, Park Ridge, IL, URISA, 400 pp.



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June 12, 2008

Professor Dawn J. Wright
Department of Geosciences
104 Wilkinson Hall
Oregon State University
Corvallis, OR 97331-5506

Dear Dawn,

I am pleased to lend strong support to the application that you are preparing for Oregon State University to become an ESRI Development Center (EDC). As you know, the College of Science has been a campus and statewide leader in GIS instruction, research, and outreach, and has always coordinated the ESRI site license for OSU. The Department of Geosciences, with your strong leadership, has led the campus efforts in GIS education and research. This is a very important part of the programs in the College.

The ESRI Development Center will help us to maintain and extend these programs, especially as we create stronger linkages with the College of Engineering and their projects involving ESRI's ArcGIS desktop and server technologies. Further, I see the establishment of an EDC as an added benefit to our existing GIS resources and capabilities throughout the College, as well as continued collaborative work with the Colleges of Forestry, Oceanic & Atmospheric Sciences, and Agricultural Sciences, the OSU Libraries, and the Institute for Natural Resources.

Thank you for leading this effort to bring an EDC to campus. It will be a tremendous asset for us and I think we can contribute much to the EDC.

Sincerely,

A handwritten signature in black ink, appearing to read "S. H. Bloomer".

Sherman H. Bloomer
Dean, College of Science



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Oregon State University, 150 Peavy Hall, Corvallis, Oregon 97331-5704
Phone 541-737-1591 | Fax 541-737-2906 | <http://www.cof.orst.edu>

June 6, 2008

Professor Dawn J. Wright
Department of Geosciences
104 Wilkinson Hall
Oregon State University
Corvallis, OR 97331-5506

Dear Dawn,

I lend strong support to the application that you are preparing for Oregon State University to become an ESRI Development Center. Here in the College of Forestry we continue to maintain exemplary research programs that focus on design and development of GIS applications using ESRI's ArcGIS desktop and server technologies. These programs almost always involve graduate students in forest science, forest engineering, and forest resources. I see the establishment of an EDC at OSU as an added benefit to our existing GIS resources and capabilities in the College, including providing a pathway toward enhancing our existing Forestry Geoprocessing/Geoprogramming Work Group. Campus wide it will also be important for us as we continue collaborative work with the Colleges of Sciences, Agricultural Sciences, and Oceanic & Atmospheric Sciences, as well as our Valley Library and Institute for Natural Resources (INR). The library and the INR are doing important work on a new Natural Resources Digital Library and series of spatial data portals that run on ESRI ArcGIS server technology and that we all contribute data to. The portal also serves the larger GIS community throughout the state of Oregon, made up largely of ESRI users.

In short, I fully endorse OSU's application to ESRI and look forward to continued collaboration.

Sincerely,

A handwritten signature in black ink, appearing to read "Hal Salwasser". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Hal Salwasser



OSU Libraries

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June 10, 2008

Professor Dawn Wright
Department of Geosciences
104 Wilkinson Hall
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Corvallis, OR 97331

Dear Dr. Dawn Wright,

OSU Libraries is pleased to offer its support for the establishment of an ESRI Development Center (EDC) at Oregon State University.

An ESRI Development Center is needed to provide special access to ESRI software and training for students at Oregon State University. The establishment of an EDC would greatly assist in improving GIS development skills throughout the student community and in building stronger ties with academic units on campus that use GIS data. The OSU Libraries Natural Resources Digital Library, the Oregon Explorer program, relies heavily on ESRI software and students trained in applications using ESRI web mapping and server technology.

I strongly support this effort and believe the establishment of an EDC would prove useful to many students at Oregon State University.

Sincerely,

A handwritten signature in black ink that reads "Karyle Butcher".

Karyle Butcher
Oregon State University
Donald and Delpha Campbell
University Librarian