OPAS Workshop 2006

November 17, 2006 at OMSI

Draft Report

Issued December 8, 2006

Abstract

During a series of facilitated discussions, 32 OPAS delegates reviewed nine strategies and concluded that OPAS should focus its resources in three areas over the next year or more:

- *Motivate: Enhance the ability of STEM education programs to increase students' interest and knowledge of engineering and applied science opportunities;*
- *Prepare: Increase the use of improved teaching methods such as active learning and student inquiry.*
- *Succeed: Increase the enrollment and successful completion of STEM courses by underrepresented populations*

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The Goals of the Workshop

- Accelerate the pace of the work of the OPAS Initiative;
- Prioritize existing OPAS strategies to identify three to six strategies on which to focus our time and energy for the coming year and guide resource allocation in the upcoming biennium;
- Identify strategies for increasing resources available to OPAS; and
- Update all members on OPAS activities, recommendations, data, and resources.

Conclusion of Workshop: Top Three Strategies

Motivate:

Enhance the ability of STEM[1] education programs to increase students' interest and knowledge of engineering and applied science opportunities.

- **Implementation**
  - Professional Development: Identify successful programs, and use their best practices to cross-train formal and/or informal programs.
  - Formal Education: Leverage educational assistants and role models in the classroom.
    - Consider variety of sources for volunteers to visit and assist in classrooms.
      - Industry volunteers
      - Young professionals with diverse backgrounds.
      - College students
    - Train teachers in effective use of volunteers.
    - Train volunteers in effective classroom practice.
    - Use SMART (Start Making a Reader Today) or a similar, successful program as a model for recruiting and matching volunteers with classrooms and students.
    - Look for programs to expand, implement, or model that have been successful within Oregon or which can be adapted to Oregon. Don't reinvent the wheel.
  - Identify and remove barriers to obtaining enthusiastic participation by administrator and teachers.

- **Funding**
  - Potential Collaborators/ Models: MESA, SAOF, Saturday Academy, ASPIRE, other OPAS groups
    - Leverage learning done by other groups.
    - There can be synergy in collaboration, not just money.
  - Develop a compelling story to point to successes so far, and make the case for an opportunity to scale for the target audience.
    - Grass-roots approach could tap into topical or historical emotion to appeal to funding sources. Immortality opportunity.

[1] STEM: Science Technology Engineering & Mathematics.

- Look to federal and private sources for grants.
    - Track record
    - Measurable results
    - Proven methods
    - Tailor individual donors to individual programs.
    - Mix and match funding sources for projects.
    - Leverage volunteer hours or employee donation matching programs
- Create systems to replicate and scale.
    - Distinguish seed/pilot projects from scaling/maintenance projects.
    - Generate projects for sustainability.
    - Consider both in-person and on-line learning.
- On a policy level,
    - Lobby for legislative earmarks, matching ideas to opportunities
    - Corporate tax credit to encourage volunteer hours by employees on company time.

- **Evaluation – Quantitative data needed to track and evaluate this strategy:**
    - Professional development
        - Contact hours
        - Survey status quo to identify gaps and target these with measurements.
    - Annual college freshmen enrolled in engineering, computer science, and applied sciences.
    - Short-term data measurements in K-12 schools.
    - Oregon University System Biennial Report "Where Have Oregon's Graduates Gone?"
    - Informal program metrics and the impact of professional development.
    - Informal programs that have been incorporated into formal programs.
    - Monsters.com data to determine Oregon graduates hired as engineers and scientists.
    - Volunteers:
        - Contact hours
        - Survey students and teachers for qualitative impact assessment.
        - Return rate of volunteers
    - TACS (Technical Assistance for Community Services) data

Prepare:

Increase the use of improved teaching methods: active learning, student inquiry, engineering problem solving, and creative teamwork.

- **Implementation**

    - Find exemplary teachers[2] and collect data on them. Make the case that active learning and engineering activities can be used to more effectively teach

[2] We need talent scouts, perhaps current college students in engineering.

technical subjects, math, and science**.** Disseminate results via professional organizations to both pre-service and in-service teachers.

- Possibly use the case study methodology.
- Use success stories to generate publicity – "anecdotes are much more powerful than data."
- Best-case scenario program
    - Pay for case development (video recording plus …).
    - Money to the exemplary teacher (personal incentive).
    - Money to the building/district (infrastructure incentive).
    - Pay to disseminate (travel, presentation costs)

- **Funding**
    - Consider building a consortium from industry to fund this effort.
    - Look to foundations, federal and state sources.
    - Keep in mind that case data is expensive and difficult to obtain.

- **Evaluation**
    - Data is inherently subjective.
    - First measure – did the classroom delivery by target teachers change?
    - Could use web-based group tools, modeled on the Amazon rating/review, ratemyteacher.com.
    - A Board of Visitors might be useful to expand our common understanding of what goes on in the classroom.

Succeed:

Increase the enrollment and successful completion of STEM courses by young women, minorities and economically disadvantaged [underserved] students.

- **Implementation**
    - Connect the resources to the people that need them; show industry how to invest time in addition to or instead of money; leverage professional organizations and parents.
        - Customize the approach based on the audience.
    - Put together a road show of best practices and present it at professional societies and meetings throughout the year;
        - Convene the people who are doing the best practices together for a day for each to do 15-minute show-and-tell; use information gained as raw data for the road show.
        - Include pre-service teachers.
        - Work through existing professional associations like CSTA, OSEC, OMEC, OSTA, etc.)

- **Funding**
    - Foundations
        - Sell this as a state-wide initiative
    - Federal and state funding
        - NSF grants

        - Reach out to legislators
    - Universities
        - partnerships with public schools
        - foundations
            - scholarships
            - Public Relations
    - Industry
        - People – volunteers
        - Funds
        - Facilities
    - Community organizations (Boys & Girls Club, Urban League, 4H …)

- **Evaluation**
    - For underrepresented groups
        - The number of STEM enrollees in middle and high school.
        - The number of STEM enrollees in post-secondary education.
        - The number that complete degrees.
    - To measure best practices
        - Use the number of AP exams in STEM courses.
        - Obtain a mini-grant to bring in an evaluation firm.
        - Develop simple systems to track the successful programs
        - Use Pre- and post- student and parental surveys to measure perception.
        - Use Student grades.
        - Increase in STEM programs statewide
        - Program replication.

Next Step

The OPAS Initiative Steering Committee and the chairs of the OPAS Subcommittees will meet on Friday, December 15, 2006 to discuss moving forward with the top priority strategies.

Appendix A – Recurring Concerns of the Attendees

Distilled from group session notes and personal communication:

- Unfunded mandates create barriers to OPAS's progress by focusing attention and resources at the lower end of the spectrum of student success; specialized programs such as PTE/CTE and IB, AP, physics and upper level chemistry are targets to make up budget shortfalls. Part of the solution here must take place at the policy level. While this is a hot button for many, few think the OPAS Initiative is the appropriate tool to fix the problem.
- We need to more tightly connect the classroom and industry, and make those connections accessible to volunteers and smaller companies. (Most Oregon companies have less than 24 employees.)
- Active learning and teaching methods could greatly improve both motivation and preparation; teachers need the freedom, support, and alignment to evaluation measures to implement such methods. Funding is an issue for materials, supplies, equipment and smaller class sizes. Large classes working on technical projects may pose special problems for safety, physical space, and classroom management.
- We need better outreach to pre-service and in-service teachers, counselors, and parents as well as students.
- Appropriate preparation of pre-service teachers regarding active learning teaching methods and career awareness and preparation for students.
- Many of the problems and issues confronting OPAS are intertwined in complex relationships, negative feedback loops, and downward spirals. Choosing the possible points for interrupting such cycles with few resources is difficult.
- Many attendees see the OPAS Initiative as a grass-roots organization empowering change agents or evangelists to act at a local level, not primarily a policy lobbying organization. Preferred methods include gathering and disseminating knowledge, communicating and networking with the community and educational and professional associations, and facilitating use of volunteers and industry connections.

Appendix B – Organization of the Workshop

Since the original OPAS summit in September, 2005, OPAS committees have developed a variety of goals and strategies for achieving the OPAS mission. In advance of the summit, these strategies were organized three categories, echoing the "themes" identified for the original summit: Motivation, Preparation, and Success.

During the opening session of the workshop the three categories were presented, each with three candidate strategies:

Motivation: Enhance students' knowledge of degree and career opportunities and increase their motivation to pursue these opportunities.

- **M1** - Document and communicate a variety of pre-engineering and applied science degree and career pathways.
- **M2** – Enhance the ability of STEM[3] education programs to increase students' interest and knowledge of engineering and applied science opportunities.
- **M3** - Improve the number and diversity of students participating in informal STEM programs.

Preparation: Increase the number of students prepared for college-level work in engineering and applied science as well as the depth of that preparation.

- **P1** - Enhance Oregon's STEM standards and assessments, especially in regards to engineering and applied science.
- **P2** - Increase the number of schools that provide high-quality opportunities for students to learn about and prepare for further study in pre-engineering and applied science.
- **P3** - Increase the use of improved teaching methods: active learning, student inquiry, engineering problem solving, and creative teamwork.

Success: Diversity, Retention, and Transitions: Increase diversity of students participating in STEM programs, enhance retention rates in engineering & applied science programs, and increase alignment between STEM educational levels.

- **S1** - Increase the enrollment and successful completion of STEM courses by young women, minorities and economically disadvantages students.
- **S2** - Improve retention rates of college programs, both generally and in specific underrepresented populations.
- **S3** - Assure that the outcomes of courses are aligned with the prerequisites of more advanced courses.

In addition, a set of suggested criteria for comparing the strategies were presented:

[3] STEM: Science Technology Engineering & Mathematics.

- How well does this choice *align with OPAS' vision, mission and goals*? Does this strategy serve to increase the number of work-ready engineers and applied scientists in Oregon?

- How much potential does this choice have to *reduce obstacles to student success*, which might include, but are not limited to access, preparation, appropriate habits of mind, socio-cultural factors, and awareness of options?

- What is the *breadth of impact* of this choice? How many students would be affected?

- What is the *depth of impact* of this choice? To what extent will the strategy engage students or others in a way that will cause depth of understanding or long-term change in behavior?

- Is this strategy a *prerequisite for other high-priority strategies*?

- Are the *resources* required to implement this choice of strategy *available*? How readily? Is there risk associated with acquiring those resources?

- Does this strategy l*everage the work of other*s or present opportunities for *synergistic collaboration?* Or, is this choice something that is already being adequately addressed by others?

- How well does this *match the expertise, connections, and passions* of OPAS members? Is this strategy exciting enough to encourage the recruitment of new members?

- Is this strategy *short-term or long-term*? Is it change that requires a short effort to produce significant results? Or, is it something that justifies sustained effort to produce a major benefit? In either case, are the benefits lasting?

Possible implementation methods were given as a tool for thinking through our collective ability to effectively address a given strategy:

- Policy
- Funding
- Collaboration
- Professional Development
- Formal Education
- Informal Education
- Grass Roots
- *Pre-Service Development*[4]
- *Marketing Programs and Materials*

[4] Two methods were added during the course of the workshop and are given in italics.

During the second half of the morning each of the OPAS delegates rotated to each of three tables where one of the strategy categories was discussed. Notes from these discussions are given in Appendix B.

At midday, two rounds of voting were held. During the first round, the field of nine strategies was narrowed to four based on the criteria above and relative values of the strategies. During the second round the field was narrowed to three based on the relative passions and expertise of those voting. The tally of these voting rounds are included in Appendix B.

The three highest rated strategies were:

- Motivate: Enhance the ability of STEM education programs to increase students' interest and knowledge of engineering and applied science opportunities;
- Prepare: Increase the use of improved teaching methods such as active learning and student inquiry.
- Succeed: Increase the enrollment and successful completion of STEM courses by underrepresented populations

In the afternoon, each of the top-rated strategies was the subject of a break-out group. The groups developed first-pass ideas on implementation, funding, and evaluation for the three strategies. The conclusions of these groups are given on page 2.

Appendix C – Notes from Morning Discussions and Results of Voting

Motivation (facilitated by Bruce Schafer, recorded by Cathy Swider)

- **M1**: Document and communicate a variety of pre-engineering and applied science degree and career pathways.
    - **Opportunities**
        - Foster a tighter connection between disciplines and bring people with industry experience to the classroom.
            - Overcome the segregation of students between "academic" and "applied" disciplines.
            - Reduce barriers for industry retirees seeking to teach.
            - Use those connections to encourage greater academic rigor, demonstrated through application by teachers and students.
        - Emphasize access and multiple ways in to a career pathway.
        - Done well, this strategy helps address diversity goals.
        - Use teachers and counselors as advocates.
    - **Concerns**
        - Motivation and information are not enough. Kids need wraparound services – curriculum awareness, college awareness, career awareness, transitions, mentors, counselors, advocates.
        - Pathways are too often interpreted as barriers.
    - **Votes**
        - Round 1 - 5
        - Round 2 – n/a

- **M2**: Enhance the ability of STEM[5] education programs to increase students' interest and knowledge of engineering and applied science opportunities.
    - **Opportunities**
        - Feature cool stuff; establish connections between cool stuff and formal things students need to know from both formal and informal classes; make it relevant to teacher/ building goals to meet standards and have students score well on tests.
        - Students exciting other students from their own experiences.
        - If we do this, M1 (documenting pathways) will follow.
        - Industry might be more willing to help if they could see direct evidence that what is being done at lower grades is really having an impact.
        - A "Capstone Project" to solve an industrial problem could provide a real connection of education and classroom to industry.
    - **Concerns**
        - Poor teacher preparation for applied math and science, especially among K-8 teachers.

[5] STEM: Science Technology Engineering & Mathematics.

- **Votes**
  - Round 1 - 20
  - Round 2 – 18 *** Top priority ***

- **M3**: Improve the number and diversity of students participating in informal STEM programs.
  - **Opportunities**
    - We have many successful models, but we don't do enough of it. Kids need these non-classroom opportunities. Kids need to experience success and many do so in an informal environment even when they are not successful in formal classrooms.
    - Information on these informal programs is not readily available.
    - Flash and Dash program connecting North Salem High School technology programs to its feeder middle schools. High school students take demonstration projects to the middle schools to recruit students to high school technology classes and the "No Boys Allowed" middle school event showing girls about technology.
    - Stimulate students to dream beyond vocational technology classes.
  - **Concerns**
    - Do we know which programs really have an impact?
    - Informal education programs serve a very small percentage of the population. Most of the contact hours are in the formal classroom.
    - Teachers in rural and other areas of generational poverty may be viewed by parents as all-knowing; we have to make sure they are informed and aware.
  - **Votes**
    - Round 1 - 4
    - Round 2 – n/a

Success (facilitated by Eileen Boerger, recorded by Michele Vitali)

- **S1**: Increase the enrollment and successful completion of STEM courses by young women, minorities and economically disadvantages students.
  - **Opportunities**
    - Expand the strategy to include all "underserved" or "underrepresented" students.
    - Requires coordination with Motivation and Preparation in a two-way interaction.
    - There is a large part of the market that we have not effectively penetrated.
    - Increase the diversity of STEM teachers for very long-term impact.
    - If we solve this, we solve the majority of our retention problems.
    - Market the ability to make a difference – change the world and work with people, not just build toasters – to recruit more women and underrepresented.
    - Other countries don't have the diversity problem we have, even in places where women have a difficult time being recognized.

- **Concerns**
  - Should this be top priority when we have declining enrollment?
  - How much of a difference is informal education making and how do we measure it? How is that impact spread geographically?
  - Women are more than adequately represented in upper-level AP courses. They just don't come to engineering and applied science.
  - The separation of the education arena from the industrial one – a society-wide problem.
- **Votes**
  - Round 1 - 16
  - Round 2 – 14 *** Top priority ***

- **S2**: Improve retention rates of college programs, both generally and in specific underrepresented populations.
  - **Opportunities**
    - "Posse" concept – students helping students, forming a community.
  - **Concerns**
    - Should this be a sub-strategy of S1 (increase diverse enrollment and completion)?
    - How does Oregon compare with other states as far as retention in Engineering and Computer Science?
    - Cost of education must be considered as an ever-larger factor in retention.
    - "Retention" perilously close to "detention"; "persistence" is better.
    -
  - **Votes**
    - Round 1 - 3
    - Round 2 – n/a

- **S3**: Assure that the outcomes of courses are aligned with the prerequisites of more advanced courses.
  - **Opportunities**
    - Need to increase STEM in K-8. Make sure expectations are articulated at every level; start at the top and push back down. Technology literacy, not just technology use, should be part of those expectations.
    - More active and informed advising along the way.
    - Multiple entry points along the way, with clear consequences at choice points.
    - Parents who are uninformed/unaware have no place to go. The system is difficult to navigate, even for a college professor-as-parent.
  - **Concerns**
    - Need to be realistic about expectations at the pre-college level. Kids in underserved programs are at a significant disadvantage. We need a commonality of preparation and outcomes so all are better served.
    - Technology literacy as a goal must be set at a top policy level.
  - **Votes**

        - Round 1 - 4
        - Round 2 – n/a

Preparation (facilitated by Dick Knight, recorded by Jo Oshiro)

- **P1**: Enhance Oregon's STEM standards and assessments, especially in regards to engineering and applied science.
    - **Opportunities**
        - The problem here is greater than standards; it is the climate of unfunded mandates with large sticks for failure at the low end and no carrots for success at the high end. There is more to assessing schools than is measured by No Child Left Behind (NCLB).
        - The only method that works here is policy; however, the science standards are currently in the review process. Current science standards are inadequate.
        - OPAS has been attempted to serve as trusted advisor to the Oregon State Board of Education (OSBE).
    - **Concerns**
        - If we don't do P2 (increase the schools with high-quality opportunities), P1 and P3 (increase the use of improved teaching methods) don't matter.
        - The amount of leverage OPAS could apply here is very limited and focused on a very few people.
    - **Votes**
        - Round 1 - 2
        - Round 2 – n/a

- **P2**: Increase the number of schools that provide high-quality opportunities for students to learn about and prepare for further study in pre-engineering and applied science.
    - **Opportunities**
        - Really aligns with OPAS goals
        - OPAS has the connections to help find resources to market the need for high-quality STEM opportunities (applied classes, PTE/CTE, AP, IB) to parents and kids, as well as the costs and consequences of not having them. Educate parents so they push the system.
        - This is the driver issue; we have to start here, not in informal education programs. If you don't have the demand for these classes, P1 (standards) and P3 (improved teaching methods) don't matter.
        - Create rewards at the building level.
    - **Concerns**
        - This is a capacity and funding problem driven by the climate of unfunded mandates and assessment of schools on limited and short-sighted criteria. Funding is a huge problem tainting everything.
        - Sometimes PTE/CTE is pitted against AP and IB.
    - **Votes**
        - Round 1 - 16
        - Round 2 - 7

- **P3**: Increase the use of improved teaching methods: active learning, student inquiry, engineering problem solving, and creative teamwork.
    - **Opportunities**
        - We need teacher incentives to enter teaching, to stay in teaching, to switch to teaching from industry.
        - Improved teaching methods for all science and math can improve the delivery of meaningful math and science to all students, improve the quality of the educational experience, and cause kids to pursue engineering and applied science courses.
        - There is a large multiplier effect here.
        - This strategy tightly linked to P2 (increase the number of schools with high-quality programs).
    - **Concerns**
        - Identifying incremental, intentional change that can be implemented at little or no cost.
        - Working through the 20/60/20 rule (20% of the people will adopt a new system fairly quickly; 60% wait to see if it really works; 20% are putting their energies elsewhere). How to identify each group.
    - **Votes**
        - Round 1 - 17
        - Round 2 – 18 *** Top priority ***

Appendix D – Materials Distributed or Cited at the Workshop

- Information packet – selected quotes and statistical summary data which frame the issue of ensuring a highly-qualified and innovative technical workforce in the future, 5 pages. Includes a summation of the subcommittee papers listed below.
- Fostering STEM Diversity, by Eda Davis-Butts, Chair, OPAS Diversity Committee – a review paper with references describing known best practices for programs which foster student diversity, 8 pages.
- OPAS Standards, Courses, and Curricula (SCC) Committee Position Statement
- Prototype Career Pathway Flyover Diagram, developed by the OPAS Alignment and Coordination: System-Wide and Career Pathways Committee. A correction has been made since the workshop.
- Preliminary results from the "Sparking an Interest in Engineering Survey" for High School and College students distributed by the OPAS Student Success: Access, Motivation, Retention Committee.

Appendix E – Attendees

William Becker	Director, Center for Science Education, Portland State University; OPAS Steering Committee; State Assessments and Content Panel for Science
Jay Bockelman	Program Director, Software Engineering Technology, OIT/Beaverton; OPAS Steering Committee; OPAS Alignment and Coordination: System-wide and Career Pathways (ACSW/CPTH)
Eileen Boerger	VP and General Manager, Agilis Solutions; ETIC; Chair OPAS Student Success: Access, Motivation, Retention (SAMR)
Joyce Cresswell	Executive Director, Saturday Academy; OPAS Marketing Engineering and Applied Science Careers (MKTC)
Don Domes	Technology Instructor, Hillsboro High School; Oregon Computer Science Teachers' Association; Software Association of Oregon Foundation, SuperQuest; OPAS Steering Committee; OPAS Alignment and Coordination: Curricular and Co-curricular (ACCC); ETIC grantee
Carla Faini	Academic Programs Manager, Microsoft; attended OPAS 2005; formerly of OPAS Instructional Professional Development (IPD)
Larry Flick	Chair, Dept. of Science and Mathematics Education, Oregon State University; OPAS Steering; OPAS Instructional Professional Development (IPD)
Bob Harder	Chair, Department of Mathematics, Computer Science and Engineering, George Fox College; OPAS Steering Committee
Endi Hartigan	Communications and Administrative Coordinator , OUS; OPAS Marketing Engineering and Applied Sciences Careers (MKTC)
Megan Helzerman	PTE Regional Coordinator, Clackamas ESD; OPAS Instructional Professional Development Committee (IPD)
Scott Huff	Dean of Instruction, Portland Community College; OPAS Steering Committee; OPAS Alignment and Co-ordination: System-wide and Career Pathways (ACSW/CPTH) - *after 11*
David Johnson	Professor of Chemistry; Director of Outreach Programs, Materials Science Institute, UO; Faculty Co-director, ONAMI; OPAS Alignment and Coordination: System-Wide and Career Pathways (ACSW/CPTH)
Don Kirkwood	Computer Science Instructor, North Salem High School; OPAS Steering Committee; OPAS Diversity Committee (DIVR)
Dick Knight	Chairman, Board of Advisors, Saturday Academy; PSU Maseeh College of Engineering Advisory Board; retired industry executive; OPAS Steering Committee; Chair, OPAS Alignment and Coordination: Curricular and Co-curricular (ACCC); OPAS Student Success: Access, Motivation, Retention (SAMR)
Valeree Lane	Director of Public Affairs, OIT; OPAS Marketing Engineering and Applied Science Careers (MKTC)
Bill Lesh	Principal, The Center for Advanced Learning; OPAS Alignment and Coordination: System-Wide and Career Pathways (ACSW/CPTH)
Tom Lieurance	Electronics Instructor, Columbia Gorge Community College; OPAS Steering Committee
Ben Manny	Manager, Advanced Mobile Networking, Intel R & D; OPAS Steering Committee
Walt Mayberry	Retired Engineer, High School CS Teacher; Entrepreneur; OPAS Standards, Courses, and Curricula (SCC)
Brett McFarlane	Newly appointed Director of Undergraduate Programs, College of Engineering, OSU
Ellen Momsen	Director, Women and Minorities in Engineering, OSU; OPAS Student Success: Access, Motivation, Retention (SAMR)
Brad Naas	Technology Teacher, Alder Creek Middle School; OPAS Standards, Courses, and Curricula (SCC); International Technology Education Association (ITEA)

Sue Peters	Program Manager, MESA (Mathematics, Engineering, Science Achievement), PSU; *alternate for David Coronado, OPAS Student Success: Access, Motivation, Retention (SAMR); ETIC grantee*
Wendy Powless	Director, Advance Credit and HS Transition Program, OIT; OPAS Diversity (DIVR)
Roger Rennekamp	Professor, Department Head & State 4H Leader, OSU; OPAS Steering Committee
Todd Sanders	PCC; OPAS Marketing Engineering and Applied Science Careers (MKTC); ETIC grantee
Diane "Di" Saunders	Director of Communications, Oregon University System; OPAS Steering Committee; Chair, OPAS Marketing Committee
Bruce Schafer	Director, Industry Affairs, Oregon University System; ETIC Executive Director; Chair, OPAS Steering Committee
Kathryn Schwartz	Software Association of Oregon Foundation; SuperQuest; OPAS Marketing Engineering and Applied Science Careers (MKTC); OPAS Instructional Professional Development (IPD)
John Tortorici	President, Software Association of Oregon; OPAS Steering Committee
Ray Vandiver	VP of Exhibits, OMSI; OPAS Alignment and Coordination: System-Wide and Career Pathways (ACSW/CPTH); OPAS Alignment and Coordination: Curricular and Co-curricular (ACCC); ETIC grantee
Michal Young	Professor, Computer Science Department, UO; ETIC CS Taskforce; OPAS Steering Committee; OPAS Alignment and Coordination: Curricular and Co-curricular (ACCC)
Jo Oshiro, Cathy Swider, Michele Vitali	*OPAS Staff Support, OUS*