Professional Advisory Board Meeting

Department of Computer Science
April 6, 2018
# Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Scheduled item</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:15am – 9:30am</td>
<td>Introduction &amp; Welcome (Dean Manoochehr Zoghi)</td>
</tr>
<tr>
<td>9:30am – 10:10am</td>
<td>Report on CS Dept and Programs (BKIm)</td>
</tr>
<tr>
<td>10:10am – 10:20am</td>
<td>Report on CS Program Assessment (David)</td>
</tr>
<tr>
<td>10:20am – 10:30am</td>
<td>Report on CS Graduate Program &amp; IS program (BKIm)</td>
</tr>
<tr>
<td>10:30am – 10:45am</td>
<td>Catch-up &amp; Break</td>
</tr>
<tr>
<td>10:45am – 12:00pm</td>
<td>Open Discussion</td>
</tr>
<tr>
<td>12:00pm – 12:45pm</td>
<td>Lunch with CS faculty</td>
</tr>
<tr>
<td>12:45pm – 1:30pm</td>
<td>Closed Meeting for PAB Recommendations</td>
</tr>
</tbody>
</table>
Introduction and Welcome

Manoochehr Zoghi, Dean of ETCS
Report on CS Dept and Programs

Beomjin Kim, Chair of CS Dept
Report on PAB Recommendation

• Recommendation of 2017 PAB meeting

1. Introduce new technologies required in the workplace: Integration & deployment, Automated testing, DB design & development, Cloud technologies

2. Improve understanding of OO principals and design patterns

3. Develop signature areas: Analytics, Machine Learning, Cyber Security, Robotics

4. Enhance skills in standard professionalism

5. Closer interactions between PAB and students
Report on PAB Recommendation

1. **Introduce new technologies** required in the workplace

2. **Improve understanding of OO principals and design patterns**
   - **Offered new courses**: Introduction to data mining, Data analytics in business using R, Penetration testing, Cyber-Physical Systems
   - **New faculty (TT & CL)** specialty in Software Engr, Cloud computing, Mobile technology, Cybersecurity
   - **Guest lectures by professionals**: Agile Project Management, Jenkins: A Continuous Integration Solution
Report on PAB Recommendation

3. Develop **signature areas**: Analytics, Machine Learning, Cyber Security, Robotics
   - Defined concentration areas
   - Offer new courses, Recruit new faculty
   - Create IoT Labs, Business Analytics Lab, VR lab

4. Enhance skills in standard **professionalism**
   - Invited lectures and personal coaching with COM faculty and professionals from local industry

5. Closer interactions between PAB and students
   - Capstone projects, Guest lectures
Dual Credit Courses in High School

- PAB recommended to increase dual credit courses
- Several states including IN mandate CS curriculum as part of K-12 education
- Five participating high schools
  - Concordia, Dekalb, Homestead, Huntington North, Wayne, Snider (Fall 2018), Bishop Dwenger (Soon)
- Offer four CS dual credit courses at High Schools
- Hosted semiannual meeting in Dec 2017 with six HS teachers
Dual Credit Courses in High School

<table>
<thead>
<tr>
<th>Year</th>
<th>Num of schools</th>
<th>Students</th>
<th>Cr. Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/12</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>2012/13</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>2013/14</td>
<td>3</td>
<td>14</td>
<td>44</td>
</tr>
<tr>
<td>2014/15</td>
<td>7</td>
<td>69</td>
<td>228</td>
</tr>
<tr>
<td>2015/16</td>
<td>7</td>
<td>50</td>
<td>161</td>
</tr>
<tr>
<td>2016/17</td>
<td>5</td>
<td>99</td>
<td>325</td>
</tr>
<tr>
<td>2017/18</td>
<td>5</td>
<td>101</td>
<td>323</td>
</tr>
</tbody>
</table>

- Three HS students taking CS classes at IPFW
## Dual Credit Courses in High School

<table>
<thead>
<tr>
<th>Year</th>
<th>CS112</th>
<th>CS114</th>
<th>CS160</th>
<th>CS161</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016/17</td>
<td>59</td>
<td>12</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>2017/18</td>
<td>60</td>
<td>21</td>
<td>18</td>
<td>2</td>
</tr>
</tbody>
</table>

- **CS 112** – *Survey Of Computer Science* (INFO I101 Introduction to Informatics: IU Gen Edu course)
- **CS 114** – Introduction To Visual Basic
- **CS 160 & CS 161** – Intro To Computer Science I & II
- Homestead offer DC courses; Canterbury stopped
- Snider & Bishop Dwenger will soon offer DC courses
- Developing *CS Edu Certificate for High School teachers*
Fall to Fall Enrollment (2012 – 2017)

Student Enrollment (Fall 2012 – 2017)

Fall Enrollment Data (Students)

<table>
<thead>
<tr>
<th>Year</th>
<th>CS Total</th>
<th>ETCS Total</th>
<th>IPFW Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>346</td>
<td>1,664</td>
<td>10,414</td>
</tr>
<tr>
<td>2016</td>
<td>361</td>
<td>1,707</td>
<td>12,289</td>
</tr>
<tr>
<td>2015</td>
<td>346</td>
<td>1,681</td>
<td>12,719</td>
</tr>
<tr>
<td>2014</td>
<td>349</td>
<td>1,736</td>
<td>13,214</td>
</tr>
<tr>
<td>2013</td>
<td>316</td>
<td>1,757</td>
<td>13,459</td>
</tr>
<tr>
<td>2012</td>
<td>308</td>
<td>1,814</td>
<td>13,771</td>
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</table>

Fall Enrollment Data (Percentile)

<table>
<thead>
<tr>
<th>Year</th>
<th>CS Total</th>
<th>ETCS Total</th>
<th>IPFW Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>12.34%</td>
<td>-8.27%</td>
<td>-24.38%</td>
</tr>
<tr>
<td>2016</td>
<td>17.21%</td>
<td>-5.90%</td>
<td>-10.76%</td>
</tr>
<tr>
<td>2015</td>
<td>12.34%</td>
<td>-7.33%</td>
<td>-7.64%</td>
</tr>
<tr>
<td>2014</td>
<td>13.31%</td>
<td>-4.30%</td>
<td>-4.04%</td>
</tr>
<tr>
<td>2013</td>
<td>2.60%</td>
<td>-3.14%</td>
<td>-2.27%</td>
</tr>
<tr>
<td>2012</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
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</table>
Enrollment by Programs
Graduation by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>CS in BS&amp;BA</th>
<th>IS in BS&amp;BA</th>
<th>ACS in MS</th>
<th>Head count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012</td>
<td>14</td>
<td>20</td>
<td>16</td>
<td>308</td>
</tr>
<tr>
<td>2012-2013</td>
<td>20</td>
<td>21</td>
<td>5</td>
<td>316</td>
</tr>
<tr>
<td>2013-2014</td>
<td>24</td>
<td>24</td>
<td>15</td>
<td>349</td>
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<tr>
<td>2014-2015</td>
<td>29</td>
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<td>346</td>
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<tr>
<td>2015-2016</td>
<td>26</td>
<td>23</td>
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<td>361</td>
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<tr>
<td>2016-2017</td>
<td>25</td>
<td>18</td>
<td>15</td>
<td>346</td>
</tr>
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</table>
Co-op Edu & Internships

• Co-op Edu & Internships (Fall 2012-Spring 2018)
  ➢ 23 placements at 7 companies
  ➢ Co-op (15), Internships (8)
  ➢ Total Number of Students: 15
  ➢ CS (17), IS (6) students

• Debra Barrick, Director, (260) 481-5471, Office of Academic Internships, Cooperative Education and Service Learning
Major Achievement in 2017-18 AY

• Grants & Publication
  ▪ $325,000+ external funding
    ➢ Dr. Coronado, three IN-MaC, $131,000+
    ➢ Dr. Chen, Harris, IN-MaC, Indiana Space Grant Consortium, IPFW, $112,000+
    ➢ Dr. Yoo, Microsoft Azure Research Award, $20,000
    ➢ Dr. Hayes, NSF, $30,000
    ➢ Dr. Kim, Targamite, TAP, $52,000
  ▪ More than 20 research articles over past couple of years
Student Achievement in 2017-18 AY

• Four capstone students, First place in student competition at the 9th Techapalooza sponsored by Do it Best Corp. $2,000 scholarship, (Advisor: Dr. Coronado)

• Four CS students, Second place at IPFW Student Research and Creative Endeavor, (Advisor: Dr. Chen)

• Student presentations at IPFW Annual Student Research and Creative Endeavor Symposium
Student Achievement in 2017-18 AY

• Student Publication
  ➢ Interdisciplinary team (CS Capstone team, IPFW Nursing, Parkview Mirror Center, Prof. Fowler, Dr. Kim), *International Conference on Internet*
  ➢ Kurtis Taylor, Dr. Chen, *IEEE International Conference on Distributed Computing Systems Workshops*
  ➢ CS graduates, Dr. Kim, *2018 International Conference on Computer Graphics and Virtuality*
  ➢ Capstone team, Dr. Chen, *IEEE Standards University E-Magazine*
Senior Capstone Projects

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Executed / Collected</th>
<th>External Sponsor</th>
<th>Research-oriented</th>
<th>Internal Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>10 / 16</td>
<td>7</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2015-2016</td>
<td>10 / 14</td>
<td>9</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2016-2017</td>
<td>8 / 13</td>
<td>9</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2017-2018</td>
<td>11 / 18</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2017-2018 (Apr. 5, 2018)</td>
<td>8 (3)</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

- 2017-2018 AY Senior Capstone Presentation, Apr. 27, 2018 from 1:00pm in KT246
Other Announcement

• Created four research labs
  - IoT & Intelligent System Lab (Dr. Liu)
  - Business Intelligence & Information Management Lab (Dr. Coronado)
  - seCure, Heterogenous & Effective Network Lab (Dr. Chen)
  - Simulation User Research Game Experience Lab (Dr. Hayes)

• Guest lectures
  - Do it Best Corp. (Fall 2017)
  - Harris (Spring 2018, After PAB meeting)
Other Announcement

• New faculty
  ➢ Dr. Venkata Inukollu (SE, Mobile Tech, Cybersecurity)
  ➢ Prof. Maxwell Fowler (Continuing lecturer)
  ➢ Visiting assistant professor (Distributed computing, High performance computing)

• Limited term lecturers
  ➢ Project manager from Do it Best Corp.
  ➢ Graduate course by professionals (Vocera Comm)

• Faculty will leave: Prof. Matthew Parker

• Job fair: Raytheon (1/30) + Vocera (2/27)

• Startup Incubator Program (Summer 2018)
Question on
CS Dept or Programs?
Report on CS Program Assessment

David Liu, Chair of Assessment Committee
Report on CS Program Assessment

• Initial feedback from the CAC-ABET
• New CAC-ABET Student Outcomes (SOs)
• Submit 2016 – 2017 Assessment Reports to ETCS and IPFW for BS CS & BS IS
• Assessment Committee recommendations
• Initial CAC-ABET feedback
  
  • BA CS Interim Report submitted in 2017
  • Draft Statement from CAC-ABET received on Dec 15, 2017
    • The program satisfies all General Criteria and Computer Science Program Criteria
  • Final decision this July
New Student Outcomes I

General Criteria

1. Analyze a complex computing program and to apply principles of computing and other relevant disciplines to identify solutions

2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline

3. Communicate effectively in a variety of professional contexts

4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles

5. Function effectively as a member of leader of a team engaged in activities appropriate to the program’s discipline

6. Apply computer science theory and software development fundamentals to produce computing-based solutions [CS]

7. Support the delivery, use, and management of information systems within an information systems environment [IS]
New Student Outcomes II

Program Criteria

6. Apply computer science theory and software development fundamentals to produce computing-based solutions [CS]

6. Support the delivery, use, and management of information systems within an information systems environment [IS]

6. Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing-based systems [IT]
Current PEOs

1. are able to apply the theoretical and technical computer science knowledge to analyze, design, implement, test, and maintain high quality computer-based solutions; [Professional Quality]
2. hold professional computer science/information systems positions or pursue graduate studies in computer science or other related degrees; [Career Success]
3. exhibit skills in effective oral and written communication, leadership, and are able to work individually and in diverse teams; [Communication, Team & Diversity]
4. contribute to Fort Wayne and the greater northeast Indiana region economy as productive and successful professionals in computing and information systems; [Economic Impact]
5. pursue lifelong learning in their computing professions; [Lifelong Learning]
6. demonstrate commitment to high ethical and professional standards within the community and profession. [Professionalism, Ethics]
Current SOs

a. An ability to apply knowledge of computing and mathematics appropriate (to the program’s student outcomes and) to the discipline.
b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
d. An ability to function effectively on teams to accomplish a common goal.
e. An understanding of professional, ethical, legal, security and social issues and responsibilities.
f. An ability to communicate effectively with a range of audiences.
Current SOs

g. An ability to analyze the local and global impact of computing on individuals, organizations, and society.

h. Recognition of the need for and an ability to engage in continuing professional development.

i. An ability to use current techniques, skills, and tools necessary for computing practice.

j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

k. An ability to apply design and development principles in the construction of software systems of varying complexity.
Direct Measures for SOs

- Each course focuses 5 – 7 SOs
- Each SO is measured from student scores in
  - exam questions
  - Projects
- Faculty reports the average score for each SO and make recommendations for improvement if average score is less than 60%
- Average score for each SO from student on-line course learning outcome survey (indirect measure) is reported as well (indirect measures)
2017-2018 Assessed Courses

• Fall 2017
  ➢ CS 160, CS 161, CS 260, CS 350, CS 380

• Spring 2018
  ➢ CS 160, CS 232, CS 350, CS 365, CS 384

• Summer 2018
  ➢ CS 331
Fall 2017 BS CS Assessment

• Course Assessment
  ➢ Direct Measures of SOs
  ➢ Indirect Measures of SOs

• Senior Capstone Project

• Co-op

• Graduate Exit Survey
Fall 2017 Assessment Recomm’s

• Work with Curriculum Committee to update concentration areas with feedbacks from employers’ survey (PEO direct) and Alumni survey, PAB, and Admittance to graduate school (PEO indirect).

• Adopt new CAC-ABET SOs and

• Update mapping: course learning outcomes → new SOs for direct and indirect SO measures.

• Update Assessment Plan and Report with feedback from ETCS Assessment Committee
Report on CS Program Assessment

• Questions
  ➢ Q1: Should we need to update PEOs for the new SOs?
  ➢ Q2

• Suggestions
  ➢ S1
  ➢ S2
Report on CS Graduate Program

Jin Soung Yoo, Graduate Program Director
Graduate Program Enrollment

- 6 senior students has applied for 4+1 CS program
Report on CS Graduate Program

• Graduate Program Name Changed
  - MS in Applied Computer Science to MS in Computer Science

• Started 4+1 Program for Dual Degrees in Fall 2017
  - BS in CS & MS in CS: 141 cr hrs = 120 (BS) + 30 (MS) - 9
  - Improve the undergraduate program by making it more attractive for prospective students
  - Improve the graduate program by integrating and retaining high-quality undergraduate students
  - Provide the local workforce with higher education to better serve in the Northeast Indiana region
Report on Information Systems

Adolfo Coronado, Assistant Professor of IS
IS Curriculum News

• Change core programming language from Visual Basic to C# (2 course sequence)

• New course
  ➢ Business Analytics using R
  ➢ Quantitative Methods for Decision Sciences: Will replace Discrete Mathematics for our IS students

• New CS Master’s course to be offered in the spring: Business Intelligence and Information Management
  ➢ This course will be used as an elective for MBA students as well
IS Curriculum News

• Make IS Introductory course (IST 160) to a General Education course
• IS Senior Capstone course to be proposed before the end of this year
• Working on developing 5-year combined program with Doermer School of Business (BS in IS + MBA)
Catch-up & Break
10:30am – 10:45am
Open Discussion

Partnership with local industry

Capstone projects, Guest lectures, Student employment, Internships & Co-op Exp
Senior Capstone Courses

• Two-semester course sequence emphasis on
  ▪ The practice of software engineering skills
  ▪ For teamwork, project management, and oral and written communication
  ▪ Developing either application-oriented or research-oriented software project
  ▪ Students experience real work problems
  ▪ Experience potential employees or future employers
  ▪ Project sponsors can acquire a software solution needed or want to explore
# Senior Capstone Courses

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Till mid-April (4/13/2018)</td>
<td>Collecting proposals</td>
</tr>
<tr>
<td>Late April (4/20/2018)</td>
<td>Kick-off meeting</td>
</tr>
<tr>
<td>Till fall semester</td>
<td>Requirement analysis</td>
</tr>
<tr>
<td>Fall semester (CS 460)</td>
<td>Complete SW design</td>
</tr>
<tr>
<td>Spring semester (CS 465)</td>
<td>Complete SW construction</td>
</tr>
<tr>
<td>End of Spring semester (4/26/2019)</td>
<td>Presentation &amp; SW Delivery</td>
</tr>
</tbody>
</table>
Employment & Participation

• Winner of student competition at the 9th Techapalooza
Partnership & Mentoring

• Capstone project meeting at the Parkview Campus
Senior Capstone Projects

• Project Sponsors
  - Allen County Public Library, Do it Best Corp, Allied Payment Network, City of Fort Wayne, Extension Healthcare, Franklin Electric, Lincoln Financial Group, Meister Cook, NeighborLink FW, Parkview Health, Parkview Research Center, Regal Beloit Corp., RINEHOLD Nutrition Services, Targamite, etc.

• Streamline Education to Employment

• Monetary sponsorship
  - City of Fort Wayne: $5,000
  - Do it Best: Scholarship
  - Device contribution: Franklin Electric, Parkview Health, Regal Beloit Corp., Targamite, etc.
Partnership with Local Industry

• Expanding **Guest Lectures**
  - Upcoming guest lectures: Parkview Health, Lincoln Financial Group, Medical Informatics Engineering, Aptera, etc.
  - Topics: SW development, Testing, Quality assessment, Project management, Design, Communication skills, Professionalism

• Student employment, Internships & Co-op Exp

• Expanding Hybrid CS courses
Open Discussion

Direction of CS/IS Programs

Desired skillsets

Needs of local community

Impact of changing from IPFW to PFW
# CS Department Focus Groups

<table>
<thead>
<tr>
<th>Concentration Area</th>
<th>Collaborating Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Science (Data analytics, Data mining, Visualization) / Informatics</td>
<td>Jin Soung Yoo, Adolfo Coronado, B Kim</td>
</tr>
<tr>
<td>Internet of Things, Human Computer Interaction, AI</td>
<td>David Liu, Zesheng Chen, Aleshia Hayes, Max Fowler</td>
</tr>
<tr>
<td>Cybersecurity</td>
<td>Zesheng Chen, David Liu, Venkata Inukollu</td>
</tr>
<tr>
<td>Software Engineering</td>
<td>Venkata Inukollu, Zesheng Chen</td>
</tr>
<tr>
<td>Computer Programming</td>
<td>George Petruska, Peter Ng, Max Fowler, Jacques Chansavang, B Kim</td>
</tr>
</tbody>
</table>
Industry Sponsored Projects

- **Six research labs** in the CS Department
  - IoT & Intelligent System Lab
  - Business Intelligence & Information Management Lab
  - seCure, Heterogenous & Effective Network Lab
  - Simulation User Research Game Experience Lab
  - The Information Analytics and Visualization Center
  - Robotics

- **Increase industry sponsored projects** (IN-MaC, TAP, TAA)
  - Indiana Next Generation Manufacturing Competitiveness Center (IN-MaC) (Up to $40K)
  - Technical Assistant Projects ($6,000)
  - Technical Assistant Agreement (TAA)
Direction of CS/IS Programs

• Desired skillsets
• Needs of local community
• Impact of changing from IPFW to PFW

• Expanding Informatics with IU programs
  ➢ Health Informatics
Open Discussion

2019 PAB meeting in mid-March?

Industry sponsored CS Scholarships

Discussion items from PAB
## Industry sponsored CS Scholarships

<table>
<thead>
<tr>
<th>Fund Name</th>
<th>Endowment</th>
<th>18-19 Award Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>App. CPE, <strong>CS</strong>, EE, ME</td>
<td>N</td>
<td>$4,982.37</td>
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<tr>
<td>EET</td>
<td>Y</td>
<td>$1,749.92</td>
</tr>
<tr>
<td>OL</td>
<td>Y</td>
<td>$1,315.92</td>
</tr>
<tr>
<td>CET, CNET</td>
<td>Y</td>
<td>$55,162.84</td>
</tr>
<tr>
<td>CEIT - not scholarship</td>
<td>N</td>
<td>$5,107.50</td>
</tr>
<tr>
<td>ME</td>
<td>Y</td>
<td>$5,171.56</td>
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<td>EE</td>
<td>Y</td>
<td>$2,087.28</td>
</tr>
<tr>
<td>ME</td>
<td>N</td>
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<tr>
<td>OL</td>
<td>Y</td>
<td>$1,255.81</td>
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Lunch with CS faculty

Closed meeting for PAB recommendations
Thank You!