The need for manufacturing automation engineers and programmers is growing at a rapid rate. The Center for Intelligent Industrial Robotics (CI^2R) will serve as an entity to foster faculty and student collaboration between cross-disciplines, applied to a host of applications from manufacturing to agriculture. The Center is providing a focus for attracting research grants and other external funding to build the University of Idaho Vandal Robotics program. The University of Idaho Computer Science, Mechanical Engineering and Electrical Engineering programs are building a 21st century program with equal attention to new software paradigms such as AI (including machine learning) and PLC programming in conjunction with industrial automation and robotics. We currently have 8 robotic labs across all three main campuses, Coeur d’Alene, Moscow and Idaho Falls. There are no comparable robotics programs in the Western US. **We are unique.**

**CENTER SUMMARY**

The need for manufacturing automation engineers and programmers is growing at a rapid rate. The Center for Intelligent Industrial Robotics (CI^2R) will serve as an entity to foster faculty and student collaboration between cross-disciplines, applied to a host of applications from manufacturing to agriculture. The Center is providing a focus for attracting research grants and other external funding to build the University of Idaho Vandal Robotics program. The University of Idaho Computer Science, Mechanical Engineering and Electrical Engineering programs are building a 21st century program with equal attention to new software paradigms such as AI (including machine learning) and PLC programming in conjunction with industrial automation and robotics. We currently have 8 robotic labs across all three main campuses, Coeur d’Alene, Moscow and Idaho Falls. There are no comparable robotics programs in the Western US. **We are unique.**

**CENTER APPLICATION AREAS**

- **Manufacturing Automation** – Additive robotics - growing segment, necessary to compete
- **Agricultural Automation** – Precision Agriculture, Automated processes (Vineyards)
- **Food Processing** – CAFÉ, food processing and production
- **Nuclear Industry** – Processing, remote manipulation, AR/VR
- **Cybersecurity** for Manufacturing Automation

**TEACHING IN ROBOTICS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CS453/CS553</td>
<td>Robotics Systems Engineering I</td>
</tr>
<tr>
<td>CS454/CS554</td>
<td>Robotics Systems Engineering II</td>
</tr>
<tr>
<td>CS466/CS566</td>
<td>Programable Logic Controllers for Manufacturing (Cross listed with ME)</td>
</tr>
<tr>
<td>CS443/CS543</td>
<td>Embedded Systems</td>
</tr>
<tr>
<td>CS455/CS555</td>
<td>Machine Vision</td>
</tr>
<tr>
<td>CS452/CS552</td>
<td>Real Time Operating Systems</td>
</tr>
</tbody>
</table>

There is additionally a Graduate Robotics Certificate in Computer Science available, requiring 12 credits of 500-level classes.

**KEY CONTRIBUTORS**

- John Shovic, PhD – UI CS (Computer Science)
  CDA Research Faculty, Director of Center
- Gabriel Petrinic, PhD – UI ME (Mechanical Engineering), Moscow
- Larry Stauffer, PhD – UI ME (Mechanical Engineering), CDA
- Dakota Roberson, PhD – UI ECE (Electrical and Computational Engineering), Idaho Falls

For more information, contact the Director of the Center
Dr. John C. Shovic – jshovic@uidaho.edu
The need for robotic automation in manufacturing is growing substantially and the lower cost of robots is making it more accessible to smaller manufacturing companies that can benefit from adding incremental automation to their lines. As part of this center, we are working with Idaho TechHelp in developing an onsite assessment tool and process for manufacturing companies to determine where automation can help in remaining competitive, worker safety and cost reduction. This will directly help smaller manufacturing companies in Idaho and Eastern Washington. As part of further outreach, we will be participating in industrial groups such as the Idaho Manufacturing Alliance and the I90 Aerospace Corridor Organization. Finally, we will be organizing an industrial advisory board for the center to bring in more manufacturing input.

### MARKET DEMAND

The global supply of industrial robots has practically doubled from 159,000 in 2012 to 294,000 in 2016. It reached 422,000 robot installations in 2018 and is forecasted to grow on average by 12% per year from 2020 to 2022. Robots for professional and personal service are expected to grow at 40% per year. The global robotics market is set to reach USD 191 billion by 2026. With a growth rate 40%, Robotics Engineer ranks 2nd among LinkedIn’s top-15 emerging jobs in the US. The University of Idaho is uniquely positioned to offer programs that fill these needs of industry and create better opportunities both for students and businesses in the area and across the country.

### University of Idaho