The **Computer Science Professionals (CSP) Hatchery** seeks to transform undergraduate education in Computer Science by replicating the best elements of a software company environment, layering in moral, ethical, and social threads with entrepreneurship and professional skills.

What makes the Hatchery approach unique?
- Short agile hatchery unit courses
- Vertical integration/threading of technical, social and ethical issues
- Direct industry collaboration

Year 3 of 5-year NSF-funded IUSE/PFE:RED project
Infusion of Ethics and Social Justice

● **CS-HU 130 Foundational Values** [Freshmen year, 1st semester]
  ○ Focus on using a framework
  ○ Focus on issues of inclusion, diversity, and justice as they occur in the practice: teamwork, design and development of products and societal impacts
  ○ Students use a custom-designed rubric, which presents issues of professional morality and ethics in a manner that fits into a general engineering process

● Case studies: Student team, John Damore, Susan Fowler
Infusion of Ethics and Social Justice

At the end of CS-HU 130, students were surveyed on two questions:

- Are matters of professional morality and ethics relevant for computer scientists?
- Can professional morality and ethics contribute to becoming a better computer scientist?

A total of 388 students responded with 90-100% (per section) agreement. Students do see this as relevant to their success as computer scientists!

- Threaded into CS-HU 153 (Navigating Computer Systems), CS 481 (Senior Design) and other courses in between
Hatchery Unit Courses

- Hatchery Units (HUs) are 1-credit, 5/7 week courses
- **Statistics**: 57 HU sections offered so far with 1591 students (non-unique) since fall 2017
- Five required HU courses
  - CS-HU 130 Foundational Values [14 sections, 473 students]
  - CS-HU 153 Navigating Computer Systems [12 sections, 354 students]
  - CS-HU 250 Version Control [7 sections, 184 students]
  - CS-HU 271 Agile Development [9 sections, 235 students]
  - CS-HU 310 Intro to Database System Usage [6 sections, 214 students]
- Several elective HU courses
  - CS-HU 390 Technical Interviews, Careers and Jobs
  - HCI, Software Testing, Secure Programming, etc

NSF IUSE/PFE:RED Award #1623189
Industry Involvement

- Through several iterative meetings with industry, we developed the Knowledge, Skills, Abilities (KSA) that led to the design of the Hatchery.
- Forty professionals from twelve companies.
Assessment

- Focused interviews with industry
- ABET assessments in courses
- Track and analyze statistics
- Surveys and interviews with students/faculty
- Social network analysis to understand community formation and structure among students
Challenges

● Faculty buy-in
  ○ Subgrants, updated workload policy
● Difficulty of threading courses
● Complexity of curriculum changes
● Scheduling complexity
● Incentives for industry professionals to teach HUs
Conclusion: Building Community

- Benefits to all participants:
  - Students
  - Industry
  - Faculty

- Impact: The long term goal is to not only make students better prepared for industry but to also enable the students to become agents of change by equipping them with the tools needed to transform industry practices.
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IUSE: Improving Undergraduate STEM Education

IUSE/PFE: RED: Professional Formation of Engineers: Revolutionizing Engineering and Computer Science Departments