Rick Gessner is a successful serial entrepreneur with over two decades of experience creating great technology product companies in California.

In 1995, Rick co-founded DigitalStyle, and created Gecko -- a revolutionary browser platform acquired by Netscape and productized as the Firefox browser. The Gecko platform produced numerous patents, and served as the basis for the modern model for internet browsers with support for XML, CSS, XUL, dynamic HTML and more. Rick holds several internet-related patents.

Rick served as Entrepreneur in Residence at Maveron, a Seattle VC firm found by Starbucks CEO Howard Schultz. Soon after, Rick was the 5th employee at a startup called Bridgepoint Education, now a publicly traded for-profit online education company, where he served as Chief Technology Officer from 2004-2010. Bridgepoint grew from 23 students to more than 80,000 online students today.

At Empowered Education, Rick was hired as Chief Architect, helping to develop a world-class social learning platform. He was promoted to Chief Innovation Officer, where he was responsible for the ensuring that Empowered products retain the cutting edge necessary to provide customers with a fulfilling, engaging and delightful experience. Empowered Ed. was acquired in 2016 by Qualcomm.

Today, Rick owns and operates a technology incubator called Goju Labs. He is also a professor at UCSD, currently teaching “The Art of Product Engineering” to future generations of entrepreneurial engineers.

Rick works and lives with his wife and three daughters in sunny San Diego. He enjoys a vibrant outdoor lifestyle, is a ranked black-belt in Goju Ryu Karate and Aikido, and a committed dad. Rick’s ongoing involvement in his community includes teaching self-defense classes to raise money for San Diego Youth Charities, teaching entrepreneurialism to local students, and as an assistant coach to his local high-school football team.
Objectives

• Students:
  • Offer outcomes that better align with emerging trends
  • Greater employability — give our students a market premium

• Programs:
  • Apply SYE themes across all our engineering programs
  • Integrate concepts into as many courses as possible

• Institutional:
  • Increased competitiveness
  • More effective public/private partnerships with industry
### Course Model

<table>
<thead>
<tr>
<th>2nd</th>
<th>Existing course with infusion of SYE themes</th>
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<tbody>
<tr>
<td>2nd</td>
<td>Existing course with infusion of SYE themes</td>
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<tr>
<td>3rd</td>
<td>New common SYE curriculum</td>
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<td>Program-specific SYE curriculum</td>
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<td>4th</td>
<td>Existing course with infusion of SYE themes</td>
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<td>4th</td>
<td>Capstone with infusion of SYE themes</td>
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Emerging themes

- Core engineering skills
- Distributed software and architecture
- Cognitive modeling & innovation
- Rapid prototyping, testing
- Reliability, validation
- Risk management, analysis
- Business fundamentals
- Customer/product awareness
- Teamwork and communication
- Leadership and project management
- Social awareness, ethics
- Sustainability
Reviewed Academia

- We studied the ECE/systems engineering programs, practices of 20 top-tier universities across the US.
- Best practices in modern teaching and learning theory
Industry Needs

- Engineers with strong **fundamental skills** (math, computing...)
- Skills in **agile methods**, communications, collaboration, leadership, requirements, sustainability, ethics, in cross-functional teams
- Understanding how to iteratively design solutions that align with **customer** lifecycle and satisfy actual needs
- Awareness of business factors and analytics that lead to achievable **products** with superior market fit
- Experience with integration of distributed, **orchestrated** solutions
Current Approach

ECE is among the leading departments of its kind in the nation, built on fundamentals of applied mathematics and engineering physics, providing multidisciplinary, systems-oriented education and research in 11 core areas.
The Program Gap

- Strong **fundamental skills**
- Experience with **agile practices**
- Understanding of **customer lifecycle**
- **Business** factors, analytics, risk mgmt.
- Distributed integration, **orchestration**
- Practiced at **cognitive modeling**
A New Vision

• Engineers with strong **fundamental skills** (math, computing...)

• Baseline skills in **agile methods**, communications, collaboration, leadership, requirements, sustainability, ethics, in cross-functional teams

• Understanding how to iterate designs of reliable, stable solutions that align with **customer** lifecycle and satisfy a need

• Awareness of business factors, analytics, and risk management that lead to better **products** with superior market fit

• Cognitive **modeling** skills that enhance creativity and innovation

• Experience with integration of distributed, **orchestrated** solutions
Four Key Components

1. Business, Customer, Product design (PDLC)
2. Distributed, integrated, orchestrated systems
3. Risk management, data analytics
4. Cognitive modeling skills, modeling tools
Course Outline

- **Fundamental** engineering skills
- Experience with **agile practices**
- Understanding of **customer** lifecycle
- **Business** factors and analytics
- Software design, architecture skills
- Dynamic, distributed **orchestration**
- Training in cognitive **model building**
- Ethics, leadership, validation, reliability

Core Curriculum
ECE 16, 140
ECE 140
ECE 140
ECE 141
New Course
New Course
New Course
Models are Critical

- System engineers will deal with complexity
- Dealing with complexity requires strong cognitive models
- Therefore, students need training in cognitive modeling
SYSE Framework

(Based on ECE140/141, SYSE Team input)

People
- Customers (personas)
- Product-owners
- Teams, hiring, training
- Biz, gov., industry

Technology
- Full-stack software eng.
- Electronics, materials
- Manuf. methods
- ML, AI
- Orchestration

Process
- Business fundamentals
- PDLC, UX, CX, IX
- Automation, validation
- Data analysis, decisions
- Risk mgmt., security

Best Practice
- Agile, entrep. methods
- Leadership, ethics, comm.
- Design Thinking
- Physics of culture
- X-domain coordination
About Cognitive Modeling

- Most engineering curriculum is based on **symbolics**
- Essential, but hard to visualize, and interaction is difficult
About Cognitive Modeling

- **Visualization** methods make symbolics easier to understand
- However, they aren’t dynamic, making relationships difficult to see
About Cognitive Modeling

- Interactive methods make simple relationships more clear
- Intuition stemming from fully dynamic interactions is inaccessible
Cognitive modeling skills help enhance intuition, improve creativity, leading to better understanding of system dynamics.

Key concepts
Flow & relationships
Play & reasoning
Theorizing