

# Design Studio

2012 - 2013  
Project Report



# How Design Studio Works

In Design Studio, we integrate Agile engineering processes, Lean business development, and interdisciplinary design thinking into an iterative process for problem solving and product development. Our iterative development methodologies lead to the development of robust software products that address real problems and provide elegant solutions. Throughout the process, Design Studio teams are mentored by industry professionals from the community, helping teams more effectively communicate, overcome technical challenges, and drive innovation for their partners.

## Empathize



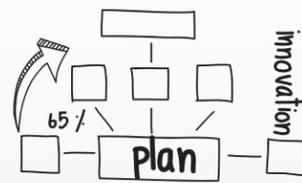
Understand the needs of the user and WHY those needs exist

## Ideate



Think about ways to address user needs in the context of their problem

## Define



Define a software component that realizes the idea and conceptualizes the solution

## Prototype

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outp(0x61 ,(inp(0x61)B));
for(i=1;i<=50;i++) {
    if (kbhit()==0) break;
```

Code the problem definition in order to see the functional solution and share it with the user



"Our Design Studio team excelled at bringing an idea to reality. They worked seamlessly with our team and customers to develop a solution that paves the way for improved communication and a paperless weight room. We're all impressed with the ownership and pride they took in this project and look forward selling it as part of our offering."  
Brian Zimmer, EliteForm

## Test



Meet as a team to show results, get feedback, and iterate

"Design Studio not only provided an internship-quality experience during the school year but also introduced me to local business leaders who helped me find my first summer internship. These opportunities have made me a better developer, a better leader, and have helped me refine what I want to do after graduation."  
David Stephens, Raikes School Junior



Teamwork

Success

"My work in Design Studio this year first and foremost reinforced strong software engineering skills, but it also taught me how to communicate effectively with a client and respond to customer needs quickly using Agile methodology. I look forward to Design Studio next year to reapply and enhance these skills, hopefully helping to guide a project from inception to client acceptance."  
Andrew Gaspar, Raikes School Junior

Raikes Design Studio

raikes.unl.edu

# Innovation by Design



Can you make that happen? It is a question that students in the Raikes School Design Studio frequently hear. Sometimes "that" means producing software to generate highly optimized pages for a search engine. Other times "that" is reshaping the way builders visualize data or imagining mobile interfaces that connect customers with analytics in an instant. Regardless of what "that" is, it will always make a positive difference to the person asking the question and, in Design Studio, the answer is always: Absolutely!

Each year, Design Studio develops connections between students and our industry partners. As our students hone their skills in preparation for life after graduation, our partners gain the talents and ideas of an elite group of achievers, leveraging the students' knowledge and skills to innovate in their organizations. I am happy to report that this year was no different. We started in August with 71 high achieving students and the daunting task of:

- Rethinking the way that gift registries can work
- Giving builders new tools to automate home placement
- Reimagining the game of golf in the world of social networking
- Cutting through thousands of product descriptions to find ways to drive search engine traffic
- Redesigning business software interfaces for a new generation of mobile devices
- Connecting hundreds of gigabytes of photographs with highly-relevant environmental data
- Streamlining how financial planners work with their clients
- Pushing athletes to the next level with mobile workout management tools
- Changing the way banks position their products to customers
- Giving coaches a winning edge by leveraging mobile technology for video playback
- Connecting local artisans with buyers from around the world
- Making it easier for law enforcement agencies and court officers to analyze communications

As I look back over how far each of our Design Studio teams have come this year, I could not be more proud. Each of our Design Studio teams rose to the challenge and delivered revolutionary innovation through software and design. The descriptions outlined in this report cannot convey the truly remarkable accomplishments of our teams.

Strategically, Design Studio continues to push the limits of what is possible for industry and academic collaboration. This year has seen the launch of three Design Studio student startups, the formation of an accelerator program for Raikes School students who want to launch their own ventures, forays into project support for on-campus research activities, the development of a channel for commercializing research intellectual property, and a reorganization of our two year software engineering curriculum. Design Studio has come a long way since our inaugural class 12 years ago, and we are just getting started.

As I look forward to the many great things yet to come, I am mindful that we could not be where we are today without the support of our partners, the dedication of our students, and the tireless efforts of those who mentor our teams. The accomplishments that I am so pleased to share with you in this report are not mine. They belong to the 2012-2013 Raikes School Design Studio class, their coaches, and project sponsors, and are evidence of what is yet to come.

It seems that every Design Studio year brings with it new successes and unimagined innovation. The work that we do, the lessons that we learn, and the progress we are able to achieve is no accident. In Design Studio, new ideas are found on every whiteboard, excellence becomes ordinary, and big things happen everyday. In the Raikes School, innovation is everywhere, it is who we are ... it is by design.

Ian J. Cottingham  
Associate Director for Design Studio

## Project: EliteForm

**Project Sponsor:** Nebraska Global

**Team:** Jessah Hofker (Second-Year), Taylor Clark (Second-Year), Derek Christensen (First-Year), Mitchell Snyder (First-Year), Cody Jung (Second-Year), Andrew Gaspar (First-Year)

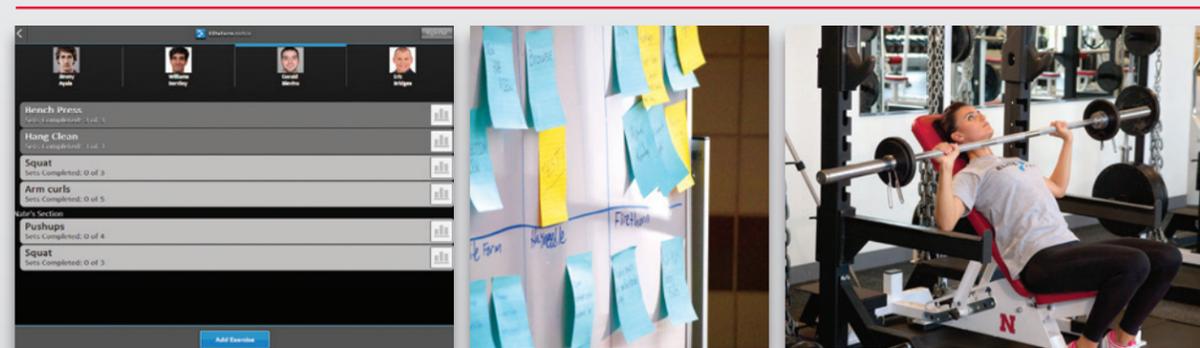
**Summary:**

Innovation through technology can be found everywhere ... even in the gym. EliteForm, a Nebraska Global company, has been offering wildly innovative holistic strength and conditioning systems for coaches and their athletes since 2012. Having seen significant success with adoption for use by Nebraska, Kansas, Florida State, Texas A&M, Lincoln High School, and many other schools and universities, the team is looking towards the future by asking how technology can make working out more effective without getting in the way. The answer: a mobile "digital strength card" that athletes can use to view and automatically record workouts, track progress, and interact with the EliteForm system. Second-Year Jessah Hofker describes the benefits of the product they have developed in Design Studio. "Our project enables athletes to access and edit their strength cards quickly so that their workouts are made effective, and a coach's time is used for the betterment of his athletes, not data entry."

The EliteForm project has offered many unique opportunities for the Design Studio team. During the project, the team worked directly with the client, co-located at the Nebraska Global offices in order to have access to developers, designers, and other resources to help the project succeed. Hofker describes the benefits of a co-located team. "We work on site with our client every day; as questions arise, we're able to get answers immediately. While creating our own solution, we've also learned how to carefully integrate with a pre-existing system." Working side-by-side with members of the Nebraska Global team, Design Studio students were able to interact regularly with product developers, allowing them to take on new features and push the limits of what was possible for the EliteForm product.

In addition to regular interaction with professional developers, designers, and managers who assist the Design Studio team, the EliteForm project has also afforded students the chance to work directly with EliteForm customers. During the spring semester, the team had the opportunity to see first-hand how a new product is taken to market, supporting a beta deployment of the product to the UNL men's basketball team.

Throughout the year the team has been able to participate in the entire product development life cycle, from clean sheet concept, through design, development, and coding, to product rollout and support. Says Hofker of the experience, "No matter what our major or interests, every Design Studio team member has taken away a distinctive lesson."



## Project: Mobile Social Network for Golf

**Project Sponsor:** Firethorn Golf Club

**Team:** Eric Hess (Second-Year), Aaron Brodersen (Second-Year), Ben Tiggelaar (Second-Year), Mike Varilek (Second-Year), John Hotovy (First-Year), Nick Graef (Second-Year), Nick Varilek (Intern)

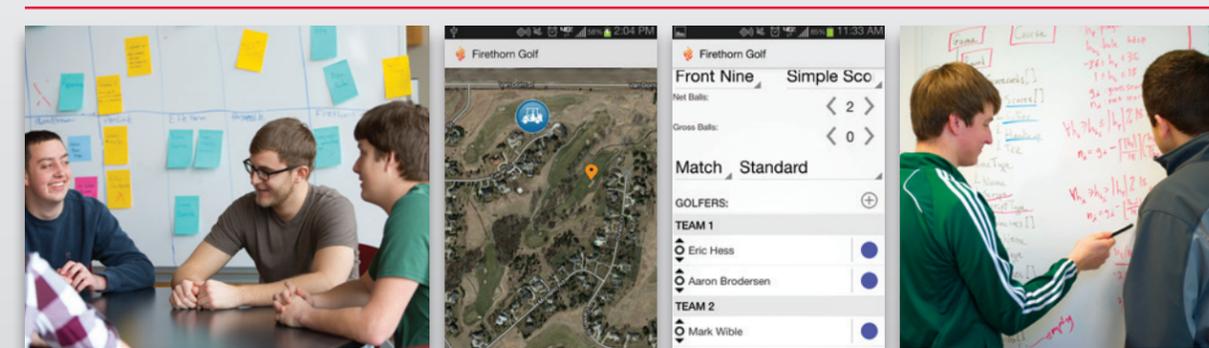
**Summary:**

When thinking of technology and golf, one generally imagines lighter clubs, highly engineered balls, or new grass seed hybrids. The actual experience of playing golf has changed very little in the history of the game. Firethorn Golf Club is looking to change that. In the digital age, attracting the next generation of club members is critical for the long-term success of their facility, and mobile plays a key role in the way digital natives interact. With a vision of a mobile social technology that enables members to interact around the game, Firethorn brought an Android and iPhone concept to Design Studio to become reality.

The resulting application is a scorekeeping app that allows members to more closely follow friends and enhance the overall experience for the golfer. With features like a custom gaming engine for individual golfer's scoring rules, push notifications, game commenting, GPS tracking for calling refreshment carts, and game tracking, the new application is set to push Firethorn, and the game of golf, into the interconnected world of mobile and social networking. The app is poised to increase operating efficiencies for the facility, and create a new kind of experience for golfers, both on and off the course.

In preparation for launching the apps, part of the Design Studio project involved researching the space and pivoting the concept as the team, and Firethorn, began to understand the market. All of the market research, business development, and engineering paid off when the system was deployed to an initial testing group during the second semester, and to all club members at the end of the project. Supporting native mobile clients on two platforms, managing a cloud-hosted infrastructure, and juggling complex business requirements are just par for the course for this Design Studio team.

The project has given Eric Hess a glimpse of what his future might look like. "The direct contact we've enjoyed with the majority owner and the club's members have provided a real-world experience that should serve our team well, long into the future." After graduation, Eric plans to take the project to the next level, forming a new company to continue development and create new innovative ways to provide value to golf clubs and their members. A task that he and his new team are well positioned for. "This involvement has provided opportunities for each member of our team to assume a leadership role at various times throughout this project. It has been gratifying to see our team grow together as a group and unite behind a common effort."



# Project: Project Scorpion

**Project Sponsor:** Fiserv

**Team:** Megan Vokal (Second-Year), Justin Pfluger (First-Year), James Dumire (Second-Year), Stosh Getzfrid (First-Year), Kevin North (First-Year), Sara Benning (First-Year)

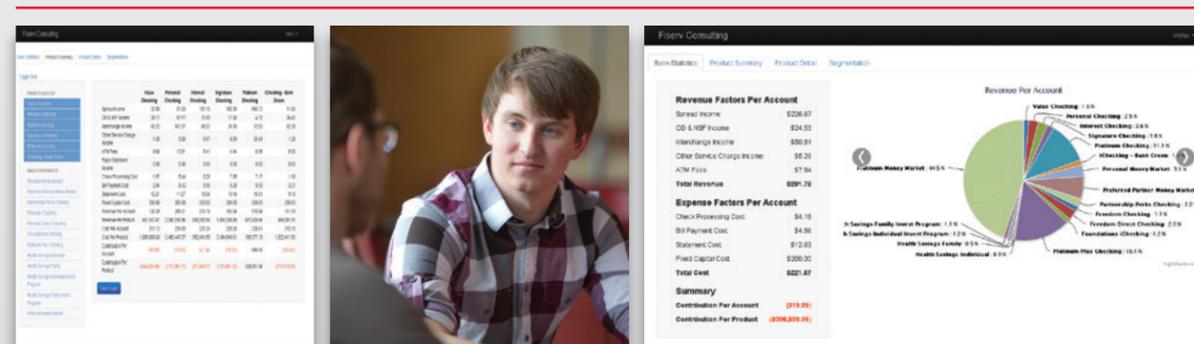
**Summary:**

The world of banking is a complex place where financial products and confusion over which makes the most sense for an individual's needs abound. Fiserv is hoping to change all that and give banks using their software important analytics data to allow them to better understand their customers' needs to be able to recommend relevant products. The Design Studio team's task, create an interactive application that highlights and creatively displays statistical banking data. With this data in hand, banking consultants will be better able to understand the needs of customers, which products are producing value, which aren't, and how to leverage those products to create financial peace-of-mind for customers.

"The application needs to be responsive, allowing data to be manipulated in real time for bank representatives" says Stosh Getzfrid, a member of the project team. "Our application not only showcases where the bank's financials currently stand, it can also model where the bank will be financially in the future if changes are implemented." Throughout the development process, the team had to gain a detailed knowledge of the banking industry; working to check and recheck calculations related to revenue, cost, contribution, and other reporting variables. The effort paid off and Fiserv consultants now have access to powerful new tools that can be used to better inform banks so that they can better serve their customers.

Stosh describes his Design Studio experience in terms of the relationships he and his team were able to form along the way. "Fiserv and the Project Scorpion Design Studio team not only increased efficiency throughout the year, but they have built personal relationships along the way. New and innovative ideas are openly shared back and forth between the client and the team creating the best product possible."

"Design Studio gives us an opportunity to think differently. In many ways, we (Fiserv) learn as much from the student team as they learn from us. It's always exciting to see how the project scope evolves from August to April based on the student's perspectives, ideas, and talent. This year's project is a transition from previous years since it is an application that Fiserv can use to assist banks with product strategy and engage more closely with their customers." **Daniel Senft**



# Project: Groundworks

**Project Sponsor:** NUtech Ventures

**Team:** Nate Watley (First-Year), Jordan Degner (First-Year), Jeff Moran (First-Year), David Stephens (First-Year), Dalton Dick (First-Year), Zach Christensen (First-Year), Keaton Greve (First-Year), Michael Hollman (Intern)

**Summary:**

After earning a masters degree from UNL's College of Architecture, Bryce Willis stood in front of two career paths: enter the workforce as an architect or start a company to use computational methods to change the way builders and architects design and place buildings. He chose the latter and Groundworks, a company led by Bryce and founded in the Design Studio, is preparing to take a research concept transformed into a cutting edge software product to market. The idea began as a thesis project focused on home generation through a set of evolutionary algorithms and evolved over one summer, as Raikes School students helped scope and focus the idea to something that was thought to be viable in the market. What resulted from that effort was the process of fitting a house plan to a plot of land and a UNL-owed research concept set to become a Design Studio student-startup project.

Project lead and student entrepreneur Nate Watley realized the potential of the concept. "Through market research, including a trip to the International Builder Show in Las Vegas, we found no other software that automates this process for home builders. Currently, most homebuilders center the home as far forward as possible on the lot after applying regional setbacks. We believe that the placement of homes can be made more environmentally friendly by helping increase natural light heating and cooling. To this end, we are attempting to program in intelligence for the homebuilder so that they will hopefully become more eco-friendly."

The concept didn't come without challenges. Over the course of the year, the team slowly began to realize how ambitious the project was mathematically and decided to use a new functional programming language, F#, for the mathematical calculations. The decision led to significant performance benefits resulting from a functional implementation of the core algorithm as well as a learning experience with a new type of programming unavailable in most internships.

As one of a new class of Design Studio projects aimed at supporting entrepreneurship, the members of the team were able to experience first-hand the sometimes chaotic environment of a startup. Recalls Nate, "As we received feedback from our partners in the industry, we were able to change direction in true startup fashion."



## Project: MarketBoard

**Project Sponsor:** State Studios

**Team:** James Verhoeff (First-Year), Derek Guenther (Second-Year), Greg Schafer (Second-Year), Clay Upton (Second-Year), Josh Cox (First-Year), Ryan Erdmann (Intern)

**Summary:**

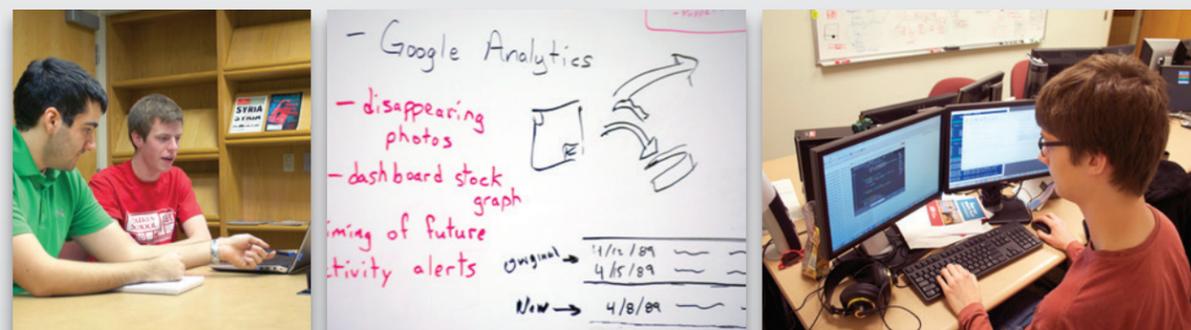
Everyone uses technology to make their jobs easier; even investment advisers. Mark Suleiman, managing principal at State Studios, believed the tools available to members of the financial services industry were esoteric in nature and developed for the methodologies used by past generations of portfolio managers. His vision: a product that gave both retail and institutional portfolio managers access to a rich content base on an efficient and modern platform. Suleiman came to the Design Studio with that vision, and some concept art, in the Summer of 2012. After two semesters of development at the Raikes School, Mark's vision became a reality. MarketBoard integrates cutting edge software that gives retail and institutional portfolio managers the ability to track communication with clients, generate invoices and performance statements, and execute trades with multiple brokerages all from one content-rich platform.

First-Year James Verhoeff leads the Design Studio development team. "Our experience in Design Studio has been unique because we are working on a startup product building a massive framework from the ground up," James explains. MarketBoard has created a unique opportunity for this Design Studio team. As a foundational product for State Studios, several members of the Design Studio team will continue to work on the product and its evolutions after graduation. Second-Year Clay Upton is one of the students who will be part of the new startup. "Of course, there are challenges that come with a startup project, and we have had bumps in the road, but we're going to maintain the momentum we've built in Design Studio."

After Design Studio, the team will continue to help their new customer base of retail investment firms and institutional investment funds integrate MarketBoard into their daily routines. As the reach of MarketBoard expands to new customers and new markets, the team will look forward to a new home in downtown Lincoln and new opportunities for continued growth and a very bright future at State Studios.

*"The Raikes School has given me an opportunity to take an idea that lived on paper and see it transformed into a rich set of pixels. MarketBoard is the core of what we are building at State Studios. I went to the Raikes School and found a dedicated team that could see my vision while being flexible enough to add their own personal touches to make our software better."*

**Mark Suleiman**



## Project: Gift Registry

**Project Sponsor:** Hayneedle

**Project Team:** Emily West (Second-Year), Adam Prusa (First-Year), Travis Schreier (First-Year), Chris Adams (Second-Year), Derek Tiggelaar (First-Year), Kaci Biederstedt (First-Year), Alec Johnston (Second-Year)

**Summary:**

When one thinks of a gift registry, one doesn't normally think innovation. That is unless Hayneedle is the one thinking about it. Where most people would see a tired and ordinary concept, Hayneedle sees a platform for social interaction that can transform the way people give gifts. Raikes School alumnus and Hayneedle project manager Matthew Brand is a believer. "As a home retailer, the customer expects us to have a solution for registering for key personal milestones. This functionality will help establish hayneedle.com as a consumer's source for everything home during a critical life stage to encourage repetitive buying behaviors, further building the Hayneedle brand." Hayneedle brought their concept to Design Studio and in April, concept became reality as the social gift registry launched on hayneedle.com.

The Design Studio team spent two semesters becoming experts on how shoppers interact with a registry in order to develop a gift registry site that allows customers to create and manage gift registries for a variety of events, share those registries, and manage gift requests. A major aspect of development was ensuring that the registry—a separate system—integrated seamlessly with the hayneedle.com website, sharing everything from data to look and feel. The effort required developing application programming interfaces that both the team and Hayneedle developers could use as they added new features and updated data. The team also developed the user interface design expertise needed to design and implement the registry Web pages consistent with the rest of the Hayneedle site.

The experience integrating new software with existing infrastructure was a valuable one for project lead Emily West. "We enjoyed working on this project, and learned a lot while doing so. It was a new experience for most of the students on the team to develop a product that used and contributed to a company's existing code base. We also had the learning experience of coordinating our efforts with development teams at Hayneedle, so that both teams had the resources they needed at specific milestones. We are very excited to see our site go live before the end of the year."

*"The students have quickly risen to the challenges that this project has presented. They learned technologies that they hadn't been exposed to, understood key parts of our business, and communicated effectively throughout the project. We are very pleased with the work done and are excited to be releasing the project during the school year so the students can be part of the go-live."*

**Matthew Brand**



## Project: Hudl for Windows 8

**Project Sponsor:** Hudl

**Project Team:** Alec Agan (Second-Year), Jake Taylor (Second-Year), Elliot McCoy (Second-Year), Pat Jackman (First-Year), Ken Lahm (Second-Year), Dan Ebert (First-Year), Danny Eberly (First-Year)

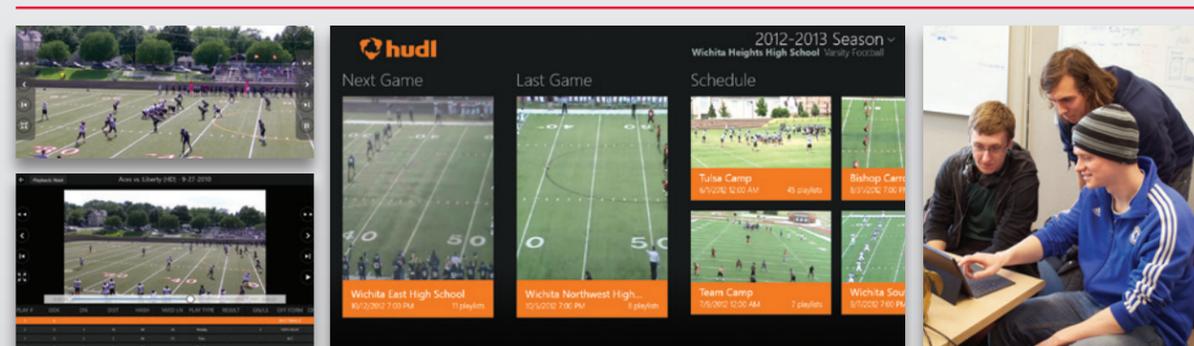
**Summary:**

When you put a company founded by three graduates of the Raikes School, a Design Studio team, and the latest mobile technologies together, big things are bound to happen. Coaches want quick and easy access to their video. Sitting down with a tablet is one of the most convenient ways to get that access. Hudl came to Design Studio to build a product to allow coaches to use latest generation Windows devices to analyze film on the go, at practice, or during class. In the fast-paced, win-driven world of sports there is no room for second place. Hudl and the coaches they support demand the best from their technology, and the Raikes School Design Studio team delivered.

From the first day, the challenge was clear: deliver the same uncompromising functionality of Hudl on iOS and Android tablets and bring it to a new class of Windows device that had yet to be released. Despite the challenge, the team dove right in, releasing an initial version of their app to the Windows Store within the first semester. From the beginning, the project was about designing around a new user interface concept and working with coaches to refine the product to deliver the best possible experience. As a result, the work done by the team has had immediate impact on the users of Hudl. Co-founder John Wirtz describes the impact the project has had. "In just three months, our Design Studio team created a Windows 8 Hudl app from scratch and released a beta version in the app store. This coming fall, the app will be used by tens of thousands of coaches from youth football to the NFL to study video."

One aspect of the project that was new for the team was that all of their work was done as open source. Not only were they creating a product that tens of thousands of people can download and use, but the source code was being stored in Github, a popular open source repository. The unique opportunity allowed members of the team to share their work with future employers, other developers, and students; letting them demonstrate their work, and receive feedback in a community-driven way. To further enhance the experience, during the first semester the Design Studio team worked directly alongside Hudl developers, setting up their team space in Hudl's Lincoln Haymarket headquarters.

The integration with Hudl designers and developers and the direct feedback from coaches helped give the team an unparalleled experience. Through Hudl, project development lead Jake Taylor had the opportunity to experience the entire development lifecycle. "Our project started with ground-up design based on feedback we received from coach interviews. Within six weeks, we had a bare-bones project in the Windows Store for download. The application has since been downloaded by hundreds of Hudl users, and is used by many of them daily. Our project has evolved with the feedback of users and concluded with an application Hudl can use throughout the next football season."



## Project: Locabal

**Project Sponsor:** Locabal

**Project Team:** Neema Bahramzad (Second-Year), Jamison Schuster (Second-Year), Taylor Smith (First-Year), Caitlin Bales (First-Year), Caleb Jares (First-Year), Paul Graff (First-Year), Nathan Allgood (First-Year)

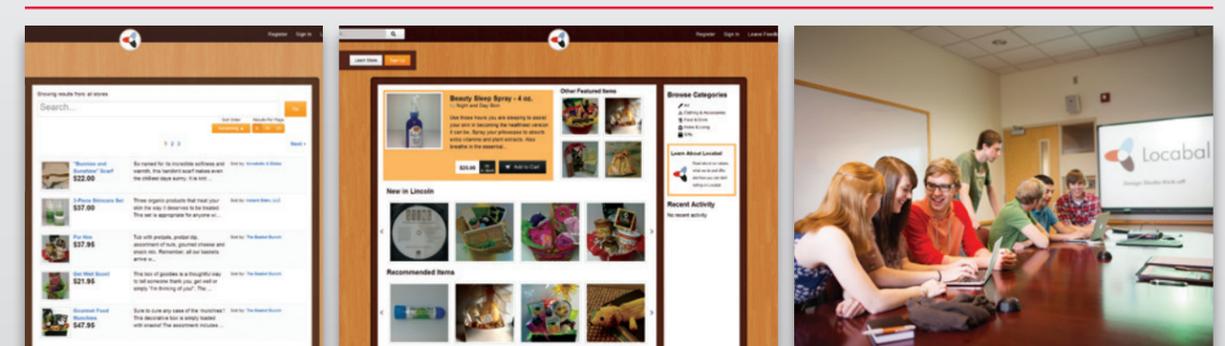
**Summary:**

Raikes second-year computer engineering major Neema Bahramzad and first-year computer science major Caitlin Bales see a connected world where producers of hand-crafted premium products sell in a worldwide marketplace. They are using Design Studio to create those connections. Their company, Locabal—launched in October—is building a revolutionary new online marketplace for small communities of artisans to sell their work. Extending concepts found in sites like Etsy and Netflix, Locabal is bringing the power of robust e-commerce and data mining technologies to a new class of consumer with a Web-based marketplace driven by social interaction.

"The Locabal project is a unique Design Studio project because it is more than just developing a software product; it is about developing a software business," said Neema. Alongside all of the engineering challenges that come with a Design Studio project, Neema and Caitlin have had to focus on building a business that can be successful after Design Studio. Part of their plan was building an all-start team of software and business developers. Throughout the year, while one half of the team was building and testing software features, the other half of the team was getting out of the proverbial building and showing the software to customers, getting feedback and lining up launch partners. "The feedback loop between the software and business aspects of the project provided a unique experience for us."

As a startup, the team was able to start with a blank slate and use the latest in Web development and cloud computing technologies to create their product. As a computer scientist, this was a big part of the experience for Caitlin. "The advantages of starting from scratch were great. The team didn't have to learn a new system, they got to use the latest technologies, and they were able to learn just how much work goes into developing a complete software solution." During the development process, Locabal was able to sign up its first sellers and incorporate valuable feedback into their product. All of the effort culminated in the launch of the Locabal website in early March, connecting artisans in Lincoln, NE, with customers around the world.

With a successful launch behind them, the next steps for the team are to continue to improve their offering to create value for sellers. "Our business developers are excited to see how they can grow the business after the launch and how we can use growth metrics to focus the marketing and sales strategies to grow the business," said Neema. As he looks to transition from a student into a full time CEO, Neema is optimistic about the future. "There were challenges along the way, but I wouldn't trade the experience for anything. This is what being an entrepreneur is all about!"



# Project: Analyzer for Windows Phone

**Project Sponsor:** Microsoft

**Project Team:** Olivia Lambdin (Second-Year), Christine Yost (Second-Year), Dan Dugan (First-Year), Trang Do (First-Year), Marco Perches (First-Year), Brian Grieb (First-Year), Daniel Baylor (First-Year)

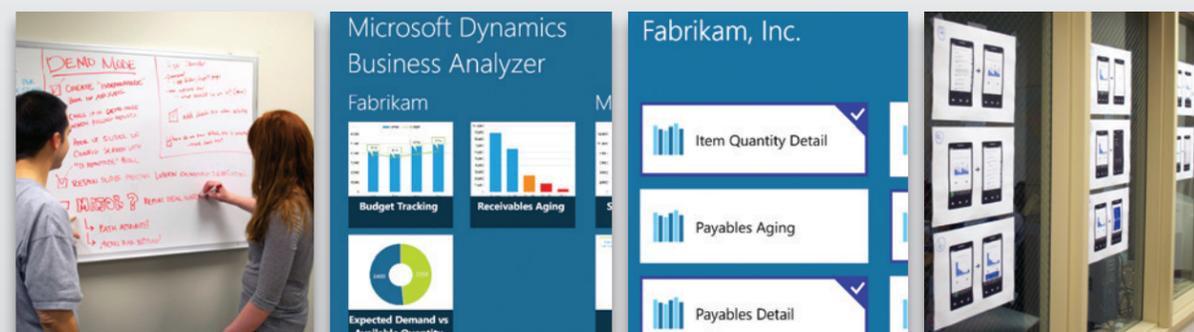
**Summary:**

In an always-on, interconnected world, business professionals need access to the latest data and reports on-the-go if they are going to stay ahead of the competition. Now, thanks to Design Studio and Microsoft, users of the latest Windows Phone from Microsoft will have the access they need.

This year, the Microsoft Design Studio team was presented the opportunity to develop and expand Microsoft Dynamics GP's Business Analyzer solution to Windows 8 mobile devices. The goal for this project was to enable Microsoft's ERP customers to access their SQL reporting services reports securely from mobile devices running the latest version of Windows Phone, allowing customers to make informed business decisions no matter where they are. In order to accomplish the goal of secure mobile access, the development team had to build enterprise Web services that would allow access to corporate data from mobile devices outside of the network. As the team awaited the release of Windows Phone 8 developer tools, they set to work replicating a corporate environment and testing their services to ensure the highest levels of security.

When the new developer tools became available in October, the team had already wrapped up their web service and designed and tested the new user experience. Diving into the code, the team worked closely with the Microsoft Business Analyzer division, with members of the team traveling twice to Fargo, ND, to meet with the MS team, demonstrate progress, and gain a better understanding of the new development tools and user guidelines. The efforts led the team to implement the new user experience and leverage new features of Windows Phone 8 to keep the user focused on important decisions and not get access to the data driving them. Through several iterations, beginning in early November, the team was ready to release their product to the Windows Store in early April, allowing them to gain valuable experience deploying live products, integrating with enterprise systems and Windows Azure, and iterative mobile development.

*"With the Windows 8 phone app the students have created, Microsoft Dynamics users will have access to their reports at their fingertips. By having this app available on the phone, our customers can make decisions anywhere and anytime. The students took a concept and wrote an app to pull SQL reporting services reports into a Windows 8 design interface for the Windows phone. This project was started before the Windows 8 phone SDK was even available. The group stayed focused and worked on storyboards so when the SDK was available they were able to jump in and get coding."* **Jennifer Ranz**



# Project: PICASO

**Project Sponsor:** Pen-Link

**Project Team:** Ryan King (Second-Year), Joe Echtenkamp (Second-Year), Matt Stubblefield (First-Year), Will Coover (First-Year), Brett Mahnke (First-Year), Steve Voznyuk (Second-Year)

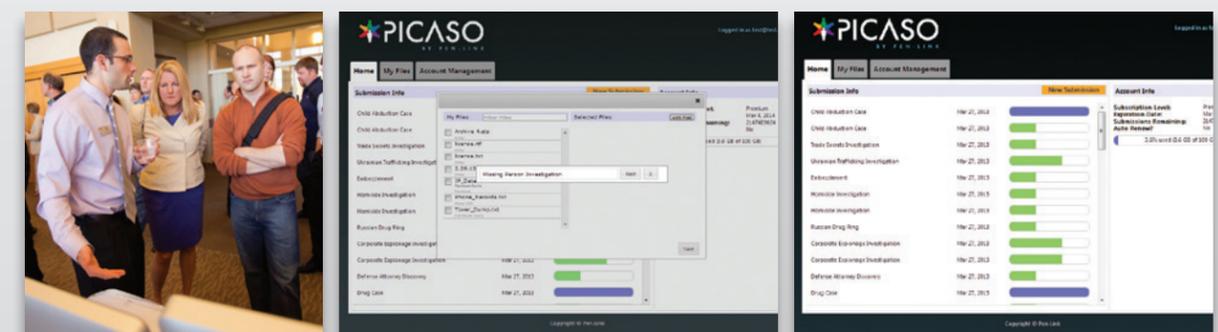
**Summary:**

Project PICASO by Pen-Link, Ltd. is an enterprise grade software solution to assist individuals and organizations that have a need to conduct complex analysis of telephonic and IP based communications. Representing a new vertical market for Pen-Link, the product is designed to leverage the power of cloud computing to enable cost effective delivery of services to small and medium-sized customers. The targeted users for this application are law enforcement agencies, attorneys, private investigators, and corporate security personnel. The system leverages the next generation PLX platform from Pen-Link as the engine to provide this cloud-based analytical service at a cost-effective price point for those users who either do not have the expertise or budget to utilize Pen-Link's more expensive PLX platform software.

Design Studio project lead Ryan King explains the project. "The goal is to provide a simple, intuitive user interface to submit raw data files, allow PICASO to ingest, normalize, and then return analytical results by 'asking' PICASO suggested questions for analytical results based on the content of the files submitted. The users of the site can sign up for various subscription levels, which in turn accounts for the number of analysis they can submit and the storage they can use on the cloud site."

In the first phase, the back end of the analysis is being done with human assistance and the front-end Web design and site management was our team focus. The Design Studio team focused on creating integration points with PLX and building out a user experience for the site. As a new product, the team was involved in designing the system in tandem with developing sales and marketing strategies. Responding to the changing needs of the business, the team was able to iterate several versions of the software, releasing the first beta version of PICASO in March. In future iterations, the goal is to have the back-end analytics machine automated in a future release of PICASO.

During the course of the project, the PICASO team had the opportunity to hold focus groups with both local law enforcement experts from the Nebraska State Patrol and Lincoln Police Department, as well as an expert on lawful interception who has been involved with one of the nation's largest wiretap networks, encompassing over 100 connected law enforcement agencies. In addition to interaction with these professionals, Pen-Link made available subject experts on both telephonic and IP-based case analysis to help us better understand the needs of potential users. During the second semester, the team was able to co-locate at Pen-Link's facility in Lincoln, NE, to further interact with subject experts on various development and design topics to get the site ready for beta. The opportunity was a good one for Ryan who graduates at the end of the year. "The team was able to work on a project that was put into production before the end of the semester, allowing us to see what beta users experience with the site; feedback on its usability and suggestion for future enhancement. This is a project that will go live and hopefully offer Pen-Link an expanded audience of potential users and business growth."



# Project: Affinity

**Project Sponsor:** Speedway Motors

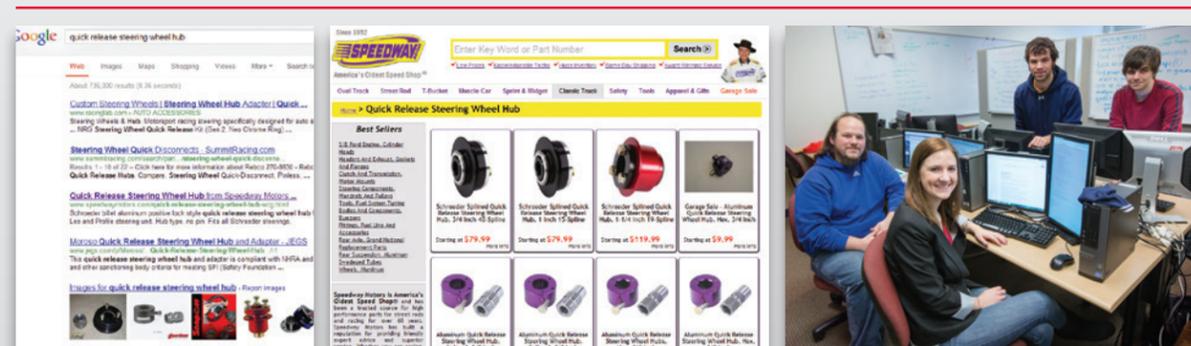
**Project Team:** Janelle Rickstrew (First-Year), Matt Claycomb (Second-Year), Michael Rogers (First-Year), Caleb Fangmeier (First-Year), Aubrey Thompson (First-Year), Alex Scheideler (Second-Year)

**Summary:**

Speedway Motors, Inc. sells over 65,000 products to millions of customers on SpeedwayMotors.com. With such a broad array of products, ensuring that potential customers can find Speedway's products by searching the Web is extremely important. Speedway's ranking in the search results depends on the quality of its landing pages; the organization of a landing page can make the difference between a searcher finding the part they are looking for from Speedway or one of its competitors. To help ensure that landing pages are directing search engine traffic to Speedway's online catalog, Design Studio was tasked with creating robust algorithms for generating landing pages that group appropriate content to increase search engine hit counts.

Raikes School First-Year Janelle Rickstrew led the team developing the process. "We approached this problem by developing an algorithm that produces groups of Speedway's products based on similarities among the products. The algorithm uses natural language processing to examine the product description and identify important words, or strings of multiple consecutive words, called n-grams. Each product's n-grams are then compared to each other and similar products are placed in the same group. Titles are created for the landing pages based on the group's most important n-grams and we use the content to generate landing pages."

No small task for even the most experienced of teams, the Design Studio team was able to deliver incredibly accurate results, out performing the algorithms used by another vendor hired to provide additional support. Proving the accuracy of and quantifying the results was a major component of the effort. Throughout the development process, the team spent considerable time testing to ensure that the algorithm performed as expected, making adjustments to increase efficiency, accuracy, and performance. Additionally, the team developed a tool to allow Speedway to determine the quality of a group and analyze its content. Gaining significant experience in applied research and statistical analysis, the team handed off the project, creating a document justifying the choices made during the development of the algorithms and outlining the process of deploying the algorithms and software for Speedway's product catalog. The next time you are searching for motor parts and you find exactly what you needed from Speedway, it may very well have been because of a robust and unseen piece of code developed in the Design Studio.



# Project: Phocalstream

**Project Sponsor:** Robert B. Daugherty Water for Food Institute

**Project Team:** Ian Cottingham (Assistant Professor of Practice), Jeremy Suing (Lecturer), Rees Klintworth (Intern), Tyler Steiner (Intern)

**Summary:**

The Platte River and the ecosystem that it feeds is one of the most significant tributary systems in the watershed of the Missouri, having a major impact on the ecology of Nebraska, Wyoming, and Colorado. In the face of global climate change, the Platte has seen both record flooding as well as record drought in the past 18 months. Understanding the impact of climate on both the river and the surrounding environment has a major impact on conversation efforts, research, and education. No one understands this better than photographer Michael Forsberg and television producer Michael Farrell, who have been studying the Platte River by developing time-lapse photographs of various sites along the Platte for the past two years.

Having produced nearly 12,500 photos for creating time-lapse videos since the beginning of the project, Forsberg and Farrell were looking for a better way to manage data. At the same time, the Robert B. Daugherty Water for Food Institute was looking for new and creative ways for research to study the Platte and for educators to use this well-known natural resource to educate elementary school students and create the next generation of scientists. In a new kind of Design Studio project, dedicated to on-campus faculty research support, the Water for Food Institute, the Time-Lapse Photography project and Design Studio faculty partnered to develop a proof-of-concept integrated photo system called Phocalstream that serves as the basis for a grant proposal to the National Science Foundation.

Incorporating the rich photoset from the Time-Lapse project and research data from the National Drought Mitigation Center and USGS, Phocalstream allows users to quickly search the thousands of photos in a visually interactive way, incorporating historical Drought Monitor and Stream Flow data with the photographs to provide a holistic picture of the impact of climate on the Platte River. The site allows students to visualize climate, discover data relationships, create their own time-lapse videos, and tell the story of their observations are of the natural world. Using a robust data annotation framework, Phocalstream allows students to participate in the crowdsourcing of cataloging and analyzing the thousands of images produced by the Time-Lapse project. If funded, the grant will allow the project team to continue development of Phocalstream, creating mobile tools to allow students to integrate their own time-lapse photography into the site and share videos, stories, and data with others through social networking.

Of the first-of-its-kind project, Raikes School Assistant Professor of Practice and Associate Director for Design Studio Ian Cottingham said, "Phocalstream is about leveraging the power of research at the University and harnessing the best and brightest minds to unlock the imaginations of aspiring young scientists. As faculty, we have the opportunity to work alongside our Design Studio students, practicing what we teach, sharing in the experience of product delivery, and providing mentorship for future Design Studio classes. I can't imagine a better way to keep learning than to roll up my sleeves and sling some code with some of the most talented young developers out there."



# Partnership, Proven Effective

Over the past 12 years, our Design Studio has partnered Raikes School talent with over 50 different organizations to complete over 100 projects. Design Studio has worked with companies of all sizes in many industries from Fortune 500s to high-growth start-ups.

Just some of the industries and companies we have worked with over the last 12 years:

## Software Development Companies

Microsoft, IBM, Hudl, Don't Panic Labs, Pen-Link, Proxibid, Software Technology Inc. and State Studios

## Health Care Companies

Cerner, Ciscare, and Madonna Rehabilitation Hospital

## Logistics Companies

Werner Enterprises, Crete Carrier, and Speedway Motors

## Insurance and Finance Companies

Mutual of Omaha, Fiserv, Nelnet, PayPal, Assurity Life Insurance, Ameritas, and Allied Strategy

## Media Companies

Jacob North, NE Press, Sandhills Publishing, and Nanonation

## Nonprofit Organizations

TeamMates, NU Foundation, NUtech Ventures, City of Lincoln, and the State of Nebraska

# What We Can Do

Raikes School students use state-of-the-art frameworks to create innovative solutions that organizations need most.

## Project Characteristics

- Web, Mobile, and Desktop Applications
- Cloud deployments
- Enterprise Architecture
- Database Systems
- Intelligent Algorithms

## Industry Standard Development Tools

- Microsoft .NET (C#, ASP.NET MVC, Entity Framework, and Web API)
- Java EE (Glassfish, JAX-RS, JPA/Hibernate, Java Server Faces, JMX)
- Native mobile development for Android, Windows Phone, and iOS
- Web technologies including JQuery, Twitter Bootstrap, Knockout JS, Angular, HTML5, and CSS3

# Raikes School Students: Design Thinkers who are ready to innovate with you.

## Design Studio

Sponsoring organizations collaborate with Raikes School student teams to solve real-world problems through design and the creation of software-based solutions.

## You Get:

- A team made up of high-achieving, Millennial generation thinking student innovators
- Client-defined software deliverables
- Opportunities to recruit top talent in software development and organization leadership and management

## Raikes School Students Get:

- Real-world client partnership experience
- A unique capstone project that formalizes their integrated computer science and management education
- Insight into a potential employer's organization and culture



# Project Lifecycle

## **Inquiry – Early spring through May**

Interested partners contact a member of the Design Studio team.

## **Proposal Development**

Design Studio faculty are available throughout the inquiry phase to answer questions and assist with the development of a project proposal.

## **Proposal Submission by May 31**

## **Notification**

Selected Design Studio partnering organizations will be notified by mid-June and faculty will begin the process of scoping and project planning with the partner organization.

## **Development – Late August – May (29 weeks)**

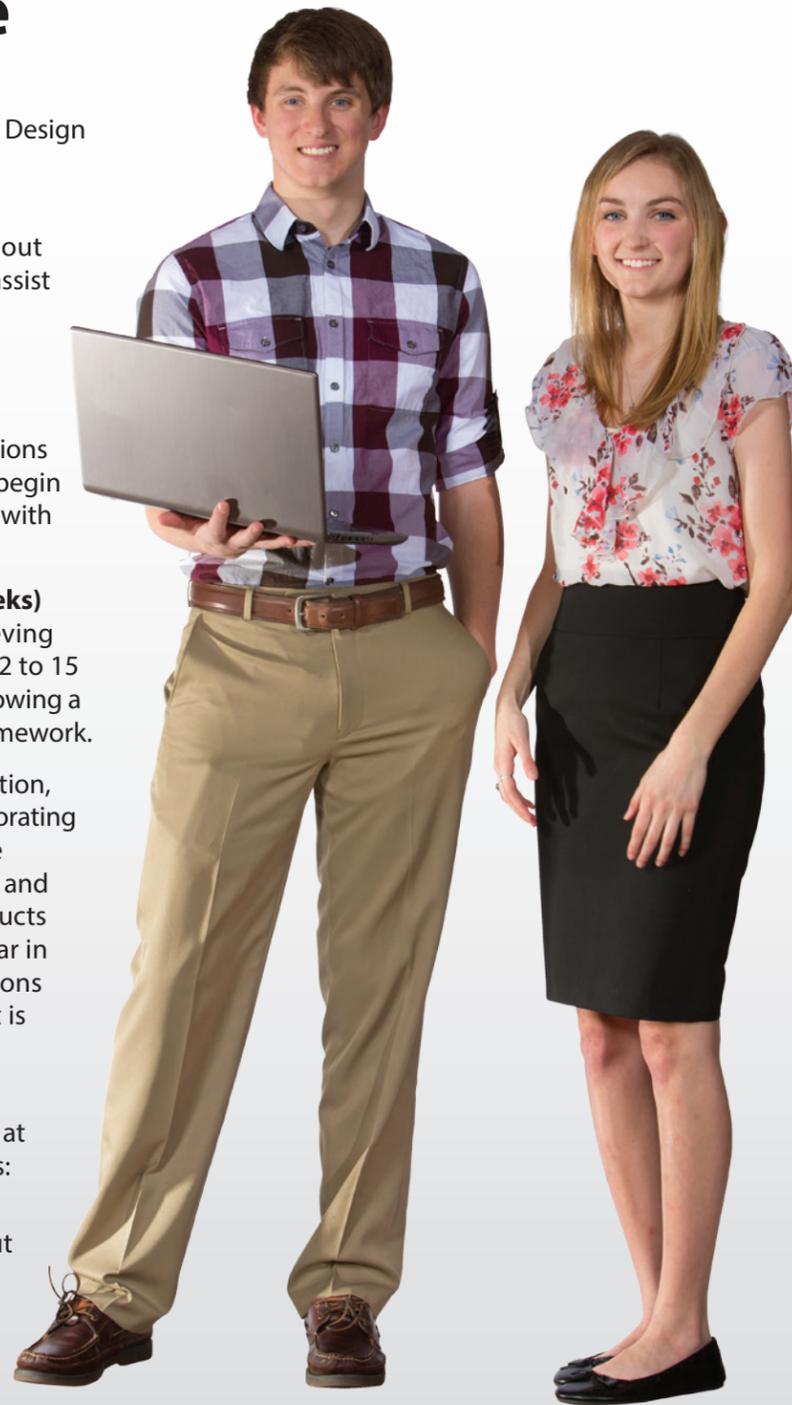
Student teams comprised of 4–7 high-achieving college First-Years and Second-Years work 12 to 15 hours during the 29-week academic year, following a highly interactive, iterative development framework.

To create the greatest value to your organization, partners should commit to assigning a collaborating product owner who meets weekly with the student team and provides regular feedback and direction. Teams release versions of the products they are developing six times during the year in a code-handoff, allowing partner organizations to use, evaluate, and give feedback on what is being developed.

## **Delivery – May**

Partner organizations receive a final product at the end of the academic year, which includes:

- Retention of all intellectual property
- Strict confidentiality maintained throughout the process
- A solution formed with some of the most talented software developers in the market
- A product that addresses some need and brings value to the partner organization .



## Your Team: uniquely focused, rigorously prepared design-thinking honors students who have done project work for at least two years prior to Design Studio.

Raikes School students have training and experience in both computer science and business management. Blending Agile development methodologies with principles of Lean Startup, they learn:

- To create innovative technologies for business
- How to manage technical development
- How to lead and manage teams of engineers
- How to strategically position technology to drive organizational value
- How to bridge the gap between technology and business perspectives.



# The Design Studio Team

**Ian Cottingham**

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**Jeremy Suing**

Design Studio Project Manager  
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**Ashu Guru, Ph.D.**

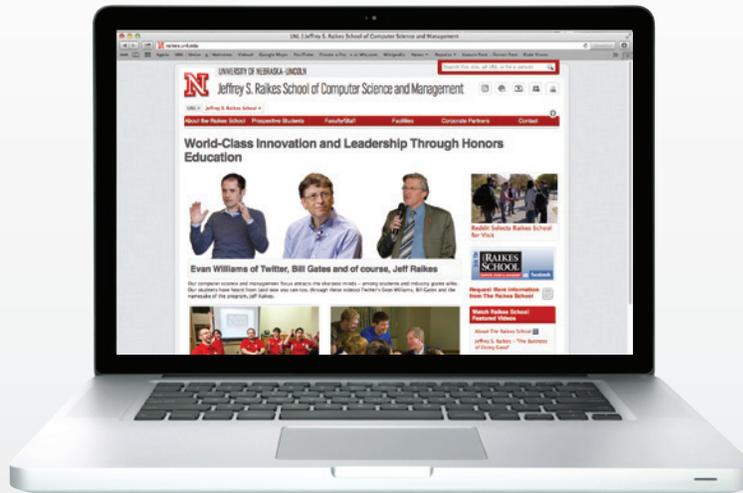
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**Tom Seevers, Ph.D.**

IBM Fellow and Visiting Professor



World-class business leadership through honors education

[raikes.unl.edu](http://raikes.unl.edu)

