# Recruiting Via an Interdisciplinary Workshop
# Centered on the Building Arts

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The Discover Architecture Workshop for high school students is a summer program that allows career exploration of professions within the building arts.  In the week long program, students complete projects that fuse Architecture and Landscape Architecture, and Architectural Engineering and Construction Management.  The program is a model of industry and academia working in partnership, as it is sponsored financially by professional architecture, engineering, and construction management firms in the state.  Since inception, nearly 300 students have participated in the program from the five state area of our region in the central USA; many of these students have subsequently enrolled at this university and completed or are currently working towards a degree in these fields.  The program serves as not only a recruiting tool for the university, but also as a public service vehicle illustrating the many ways that design, engineering, and construction professionals add value to the quality of human life.

Program Description

The week long Discover Architecture career orientation summer program for high school students has been offered by the School of Architecture from 2002-2005 and 2009-2016.  Since 2013, the faculty of this program expanded the academic content of the workshop to include the allied disciplines of Landscape Architecture and Construction Management.  This has provided a more full exploration of the various professions involved in the building arts, and has helped us achieve a broader freshman recruitment for the university.



Group picture on an evening campus walk, 2016                    Construction site tour on campus, 2015

The Discover Architecture program upholds the Land Grant mission of OSU through instruction, and outreach to the high school community.  Additionally, the program is a model of industry and academia working together - annually eight to ten professional design firms from the state sponsor the program, and their employees interact with the students and faculty.  The workshop

is a unique interdisciplinary educational opportunity utilizing the framework of the building arts, and makes it available in an economic manner to the next generation of college students from across the state and nation.

Needs Addressed and Program Focus

The need for highly qualified and motivated professionals in the fields of architecture, architectural engineering, landscape architecture, and construction management remains constant.  In Oklahoma, there are only 821 licensed architects living and practicing in the state - 1 architect per 4,780 citizens.  By comparison, the closest neighboring states of Kansas and Texas have 850 practicing architects (1 per 3,420), and 7,941 (1 per 3,500) respectively. Missouri, which has no state-supported School of Architecture to feed its core of professionals, claims 2,092 licensed resident architects, or 1 per 2,900. (NCARB 2017; US Census Bureau 2016)

There are eighteen ABET accredited Architectural Engineering programs in the nation, thus the number of practicing professional architectural engineers nationwide is very small though the demand for personnel with expertise in this area is exceptionally high. Graduates with a Bachelor of Architectural Engineering degree are recruited by firms from across the nation, and paid lucrative starting salaries. (US Dept of Labor Statistics 2016)

The planning and development of new construction and the redevelopment of existing building sites is expected to drive employment growth through 2020 in the landscape architecture profession. With land costs rising and the public's desire for more beautiful and functional spaces, in addition to environmental concerns and increased demand for sustainably designed construction projects, the need for the services of landscape architects will continue to grow. OSU offers one of only 68 accredited landscape architecture program in the country. (US Dept of Labor Statistics 2016)

The US Construction Industry employs 5.5 million workers, with 70,000 employees in this state. To execute the increasingly complex designs of the architect and engineer, professional constructors are needed to build the visions set forth by the design professionals. A degree in Construction Management Technology provides a highly specialized education that prepares students for successful careers in the management of the construction process. (Associated General Contractors of America 2016)  OSU's Construction Management Technology major is the only accredited program in the state of Oklahoma.

Architects, engineers, landscape architects, construction managers, and their clients, are responsible for the physical environment of our nation.  Even more critical than increasing the numbers of students choosing to pursue careers related to building design and construction within the nation is the need to develop an understanding of, and an appreciation for what professionals in these inter-related disciplines can provide for a building project.  Great cities are composed of great architecture!  Coordination and communication underpin the profession, such that well-designed architecture is the result of the successful integration and application of many related disciplines on many levels of the entire process.  This summer workshop allows high school students to experience and understand more about these professions, which generates a

more highly educated public; the students are encouraged to consider pursuing one of these disciplines at the college level.

Program Structure

The Discover Architecture workshop is a residential, one-week academic program held during the summer.  Annually, 24 to 27 students are invited to participate, based upon the quality of their academic preparation and their submitted application for the workshop.  Base measures for acceptance into the program mirror the requirements for entry into the university through general admissions – an ACT of 24 or high school GPA of 3.5 are the standard minimum thresholds. Candidates are also required to supply an academic transcript, and an example of their creativity which could be a freehand drawing, a computer program creation such as in Minecraft, a 2D or 3D artwork created in an Art class, an Eagle Scout project, or similar.  Applicants also answer questions such as what their favorite subjects of study are, why they wish to attend, and what they think a design professional actually does.  These answers provide insights into the candidates' motivation for attending the workshop, and their seriousness of purpose.

Drawing workshop with the professor, 2016        Participants hard at work on their design projects, 2014

The workshop curriculum consists of sessions focused upon sketching, general problem solving, engineering design, environmental design, a construction activity, and computer applications. A construction site on campus offers the ability to see firsthand what it takes to bring architecture into being.  Participants interact with university faculty and current students pursuing these disciplines, as they complete hands-on learning activities.  As a special feature, participants enjoy a field trip to the major urban center in the state to tour a noteworthy work of architecture and visit a professional firm.  The conclusion of the workshop is a public show of student work; parents are invited to learn about what their student has accomplished in the program.

Interdisciplinary Methodology

The theoretical assumptions and operational methodology for the Discover Architecture workshop can be summarized by the following: an emphasis on hands-on project-based learning, problem-solving, tactile and digital skills building, and peer learning alongside professional mentoring.  The academic content of the program consists of short presentations followed by interactive experiences to stimulate the participants' curiosity and interest in a myriad of issues surrounding the creation of architecture.  A joint design project with Architecture and Landscape

Architecture - to design a space of gathering on campus, and a separate joint project with Architectural Engineering and Construction Management - to design, build and test a structural element or material - illustrate the interdisciplinary nature of the world of architecture.

The Architecture/Landscape Architecture project begins with an introduction to campus architecture, and the fundamental design principles that underpin the design of building masses and facades – concepts of scale, symmetry, points of hierarchy, repetitive patterns, circulation movement, etc - and an exploration of the resultant outdoor spaces that occur between buildings. Further, a field trip to the university Botanic Gardens offers further discussion of concepts in landscape design – soft and hardscapes, planting strategies, geometries, and orientations with regard to sun movement and wind patterns. The design project begins with an on-site analysis of a specified campus space, an outdoor room. Subsequent to the analysis, students develop design goals, and then investigate potential strategies through precedent research, to expand their visual vocabulary. Working in teams, they are tasked with preparing proposals for the redesign of the campus space. These proposals are critiqued, revised, and prepared for graphic, visual and verbal presentation to their families on the final morning of the workshop.

Architectural Engineering design is introduced through a balsawood truss design project, which has mathematical parameters and connection constraints, and is subject to load testing in the Structural Stress Analyzer unit. The Construction Management exercise furthers this study with the measuring, mixing and pouring of concrete into slumps that are tested 3 days later with a load testing machine. The slump cones are analyzed based upon weight of the concrete vs load carried, illustrating the fundamental concept of engineering economy in project design.


Students perform a slump test, 2015          Mixing Concrete, 2015                              Building a truss, 2014

The professional world of building design and construction is showcased through lunchtime mentoring sessions with professionals at varying levels of their careers, and through interactions with current university students serving as teaching assistants and residential assistants. A guided tour of a working construction site on campus allows all of the disciplines necessary to complete a work of architecture to be illustrated as an organic, interdisciplinary whole. Finally, a tour of a professional firm caps the week long experience, where students visualize the office environment and see professional architects and engineers at work on actual projects.

Management Structure, Academic Instruction, and Budgeting

The workshop is directed by Professor Suzanne Bilbeisi, a licensed architect and senior faculty member of the School of Architecture.  In her role as director, she is responsible for publicity, recruitment of applicants, selection of participants, coordination of the educational content, management of the day to day activities of the program, and the budget.  She also participates in the instruction of the workshop, supplementing the teaching effort from the other faculty associated with this program.  Professor Steven O'Hara, a professionally licensed engineering faculty member instructs the academic section focused on Architectural Engineering issues.  Professor Moh'd Bilbeisi, a licensed architect, professor, and nationally recognized graphics and design guru instructs the students during the architectural design project, and the sketching and computer applications segments of the academic program.  Since 2013 when the content of the program was expanded to become more interdisciplinary, Associate Professor Heather Yates, a faculty member from the Construction Management Technology program leads those sessions, and a licensed Landscape Architect faculty member Assistant Professor Cheryl Mihalko directs the sessions in Landscape Architecture design.  All of the faculty for Discover Architecture are experienced educators and tenured or tenure track faculty at this institution. Carefully selected advanced students in the college are employed as Residential Assistants to serve as supervisors of evening activities and to maintain safety for all participants.

The absolute key to the success of any program that is aimed at a younger group of students (high school level or earlier), is the ability of the instructors and teaching assistants to connect with the students. The reception of the content is dependent upon the quality of the delivery! Therefore, for this program we have carefully cultivated the faculty resources and chosen only those professors who naturally inspire. We pay them for their work in the program - it is our belief that faculty must be paid, in recognition of their commitment and quality instruction.

The program costs to cover accommodations in the university dormitory, all meals, project supplies, transportation, and faculty and teaching assistant salaries for 24 participants annually amounts to a budget of approximately $16,000 – or a raw cost of $660/student.  Contributions from alumni and professional firms in the state in the amount of $5,000 to $6,000 reduce the fee for participants to $400 for the week long career exploration experience.  Annual surveys conducted by our staff of regional peer institutions who also offer summer programs reveal that this is the least expensive high school academic workshop in our area; the range of fees for other programs is $500 to $800 per week, multiplied by the number of weeks duration of the program. For us, this unique partnering between academia and the profession to lower costs is critical to ensuring that a pipeline of qualified students enter the study of the building arts, and that there is an informed public in our region who will hopefully better appreciate what design professionals contribute to the quality of life for humanity.

Program Success

In the detailed assessment undertaken at the conclusion of the workshop each year, the students are surveyed to determine the effectiveness of Discover Architecture.  Typically, the participants rate the workshop an average of 6.4 - 6.6 on a scale of 7.0; they overwhelmingly agree the program was a valuable educational experience. The also respond very favorably to the question, "Would you recommend Discover Architecture to a friend?" Of the student participants from

2009-2016 who are now college-age, more than half have chosen to pursue a degree at this university!  Student's personal comments further illustrate the impact of the program:

*"In high school, you don't get the chance to take many design-specific classes - you have science, math, art, history, government, but it's difficult for high school students to find resources and information about architecture and design. This program was the first time I was ever challenged to think with an architectural mind. The Discover Architecture workshop was the absolute best confirmation I had about deciding to attend here for Architecture!"*
    *2012 Discover Architecture participant, and 2017 graduate of Architecture*

 *"Expect to learn a lot.  I knew I was going to be introduced to architecture, but we were really immersed in it.  Over the course of the week, I grew to love this university and the School of Architecture in particular. Architecture is a unique major that allows you to be both analytical and creative. Discover Architecture was a great experience, and gave me an advantage when I started school here".*
    *2013 Discover Architecture participant, and current senior in Architecture*
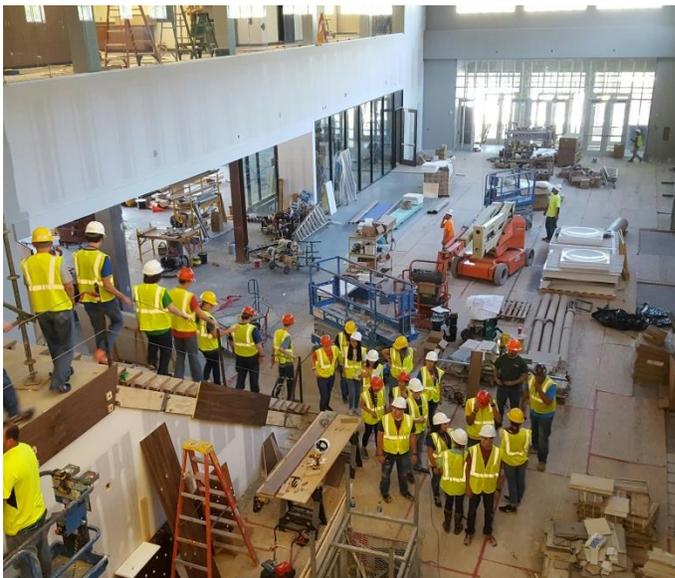


Campus construction site tour, 2016



Field trip to a local museum and formal garden, 2016

*"My experience at Discover Architecture reaffirmed my belief that architectural engineering was what I wanted to do. The thought provoking, hands-on projects taught me to think and work in a unique way that has helped with projects in studio and other courses at the university."*
    *2010 Discover Architecture participant, and 2016 graduate of Arch Engineering*

*"Discover Architecture is an extraordinary experience to learn about the fundamentals of design with great professors and students currently in the architecture program."*
    *2014 Discover Architecture Participant, and current junior in Architecture*

Of the most recent graduating class (2016-2017) at our institution, five of the forty graduates (1/8th!) in the Bachelor of Architecture and Bachelor of Architectural Engineering programs were

high school participants in the Discover Architecture program. This trend is normal, but even more importantly, Discover Architecture participants are the ones who tend to make the greatest impact while they are students in the undergraduate program, and the most highly decorated upon graduation. This year's outstanding graduate of the School of Architecture was a high school participant, and several of the other past participants received recognition as well.

While there are more than a hundred career exploration academies focused upon architecture offered across the nation annually, few, if any incorporate the STEM disciplines of engineering and construction alongside pure architectural design concerns. (www.studyarchitecture.com content 2017) And of the several hundreds, if not thousands, of engineering programs offered nationwide for K-12 students that are listed on the Engineering Service Center website, none incorporate the art of architecture with the skills of engineering. (www.engineeringedu.com content 2017) We believe that the framework of projects loosely gathered under the umbrella of 'the building arts' allows for constant reimagining of project particulars, and provides the flexibility that allows for taking advantage of unique opportunities as such present themselves. Over the years, these opportunities have included a special field trip to a recently completed monument in the state, a unique partnership with a firm sponsor, attendance at a special campus event, etc. This continuous improvement keeps the program fresh for the faculty, and allows each group of annual participants to have a unique and memorable experience at the university.

Within the culture of OSU as a land grant institution, where the disciplines related to the building arts are located in separate buildings, and even in separate colleges, the Discover Architecture workshop uniquely encourages cross disciplinary collaboration and creativity. This is important for faculty, and has led to relationships that have impacted other teaching and research endeavors. The Discover Architecture workshop fulfills the need to inspire our youth to prepare academically for their arrival at the university and to pursue potential careers in Architecture, Engineering, Landscape Architecture, and Construction Management. Further, Discover Architecture embodies the land grant mission of the university through outreach, as it helps to educate young citizens on the value and importance of the building arts to the future economic vitality and aesthetic development of the state, nation, and world.

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Author Biographical Information

**SUZANNE BILBEISI,** AIA, Centennial Professor of Architecture and Head
Professor Bilbeisi has been a member of the faculty at the Oklahoma State University School of Architecture since 1993.  She has been the faculty coordinator for the Intro to Architecture course and Design Studio I at OSU, which has effectively positioned her as coordinator of the freshman experience in the School of Architecture for almost two decades.  As a result of her interest in working with college freshmen, Professor Bilbeisi expanded her involvement with young people by developing pre-college programs.  From 1996-2003 she co-directed the summer OSU REACH academy for Oklahoma girls interested in engineering and architecture, and from 2002-2005 and 2009-present she developed and directed the Discover Architecture career exploration workshop attended by high school students from across the nation.

**Mohd Bilbeisi,** RA, Professor of Architecture
'Professor Moh' is an inspirational and imaginative professor, architect, author, illustrator, and watercolorist. He is an award-winning educator, having received many national and international awards for his work in teaching, drawing and illustration.  He is the recipient of the 2016 OSU Eminent Professor award, in addition to placing First Place in the KROB Architectural Delineation Competition and First Place in the American Society of Architectural Illustrators' International Competition in the sketch category. Professor Bilbeisi has been a faculty member at Oklahoma State University School of Architecture since 1998, previously having taught at the University of Oklahoma. He lectures nationally and internationally on the topics of Design, Graphic Communication, and History/Theory of Islamic Architecture. Professor Moh has been the lead faculty member developing and teaching high school students in the Discover Architecture Workshop since the inception of the program in 2002.