2020 SUMMER OPPORTUNITIES

PART I

2020 Illinois Engineering Summer Camps

Danville School District 118 is excited to offer
University of Illinois Summer Camps
to our Danville High School
INCOMING SOPHOMORES, JUNIORS, AND SENIORS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
PUBLIC ENGAGEMENT

ALL APPLICATIONS ARE DUE
TO DANVILLE HIGH SCHOOL
BY FRIDAY, FEBRUARY 21, 2020!

Brandie Kuchefski (217)444-1065
February 2020

Hello, Danville High School Families,

The University of Illinois Engineering Department is offering week-long residential camps for incoming sophomores, juniors, and seniors. The different camps are described in the enclosed *2020 Illinois Engineering Summer Programs* booklet. The camps are *free* to those Danville District 118 students selected for the program.

In order to be considered for the program, students must make application as described in the summer programs booklet. The application process requires a letter of recommendation from both a parent and a teacher. Please note in the application that Danville District 118 is listed as a second parent. This allows the district to coordinate communication between the University and our students.

Applications are due to the Principal’s office no later than February 21, 2020. High school guidance counselors are available to assist with the application process. Please understand that all applicants may not be accepted, so submit applications early.

We expect to provide additional exciting summer opportunities in partnership with the University of Illinois. Please look forward to hearing more about exciting Summer 2020 programs.

Sincerely,

[Signature]

Dr. Alicia Geddis, Superintendent
If accepted, students will need:

1. parent | guardian recommendation letter
2. teacher recommendation letter

All camps are weeklong, residential experiences paid for by Danville District 118.

Transportation will be provided.
Bioengineers study and understand how complex biological systems work and how to design and construct medical devices, better therapeutics, and solutions to large health and wellness problems facing society today. This camp focuses on the technical while also considering the societal impacts on current issues of healthcare, health disparities, and sustainability.

We have many exciting activities planned to engage young students in the field of Bioengineering:

- Learn from short lectures on the human body, health, and the field of Bioengineering provided by faculty and researchers in the field.
- Engage in labs covering genetics, cell culture, tissue engineering, biomaterials, biomechanics, bioinstrumentation, biological machines, and more.
- Apply new concepts through hands-on lab activities relating to current state-of-the-art techniques within amazing research facilities.
- Bond with campers and staff through fun and engaging activities.
- Visit the Jump Simulation and Education center to learn how engineers and doctors work together to solve many of today’s biggest health issues.

The capstone camp project puts your engineering skills to the test as you design a medical device, inspired by the activities during the week of camp.

*IDEA camps aim to increase the number of underrepresented populations pursuing STEM majors and careers
**EAGER camps aim to increase the number of women and gender non-binary students pursuing STEM majors and careers

The Electrical Engineering camp for high school students explores the depth and breadth of Electrical and Computer Engineering. Campers learn how research in this discipline benefits society as a whole. The technical program includes classroom instruction, demonstrations, hands-on activities, tours, usage of research facilities, and four team projects. The curriculum showcases practical applications of ECE (circuits, signals, electromagnetics, power, nanotechnology, solid state electronics, and photonics) by investigating a real world technology – the cell phone. Projects include:

- Building an FM transmitter by laying out the parts of their circuit on a proto board, determining their purpose, and then soldering together an FM phone that they take home with them.
- Using an online circuit simulator to learn about logic gates before building an LED calculator circuit that adds numbers as high as 3 plus 3 and displays the result with light.
- Working in a university cleanroom laboratory to make a solar cell and phototransistor
- Building an image projector out of folded paper that holds an LED flashlight, a 1" square transparency, and a lens.
Exploring Your Options (EYO) is a week-long, residential program that introduces rising juniors and seniors to the varied disciplines of engineering. EYO takes place at the University of Illinois at Urbana-Champaign, providing campers with the opportunity to interact with engineering students and faculty during the lessons and hands-on activities developed by the departments in The Grainger College of Engineering.

Due to its popularity, this camp is offered twice during the summer to provide more students with the opportunity to attend.

Get a taste of each of the following engineering fields:

- Aerospace Engineering
- Agricultural Engineering
- Bioengineering
- Chemical Engineering
- Civil Engineering
- Computer Science
- Electrical & Computer Engineering
- Industrial Systems Engineering
- Material Science and Engineering
- Mechanical Science and Engineering
- Nuclear, Plasma, and Radiological Engineering

The Illinois Aerospace Institute summer camp is a one-week residential program for students entering grades 9-12 who are interested in learning about the fields of aerospace engineering and aviation.

What do you think of when you think of computer engineering or computer science?

Maybe you think of a programmer alone late at night in front of a screen, or a hardware hacker surrounded by blinking computer parts. Computer science is not just coding, and computer engineering is not just electronics. Computing is all around us, and you can find it almost everywhere. In this camp you’ll explore how code intersects with your digital and physical worlds.

In this camp you will have an opportunity to:

- Learn fundamental concepts found in any programming language using Scratch, a popular open-source programming language developed at MIT.
- Design and create a mobile app for Android phones or tablets using App Inventor, an open-source app development tool.
- Explore the intersection of art, fashion, and technology through e-textile projects.
- Make copper tape circuits to examine basic electronics.
- Write computer code for microprocessors that will control a wearable tech accessory, an interactive art piece, or a literature project that you design.
- Investigate topics related to cybersecurity and protection of critical infrastructures.
- Connect hands-on experiences to computer simulations.
2020 EXPLORING NUCLEAR, PLASMA, & RADIOLOGICAL ENGINEERING CAMP (ALL-GENDER)  
SUN 6/21/2020 – SAT 6/27/2020

11th-12th grade

Campers will explore nuclear, plasma and radiological engineering disciplines through many hands-on projects and demonstrations. Through individual and team activities, participants will investigate the disciplines of nuclear energy, plasma and fusion technologies, and radiological science. They will consider questions like:

- How does a nuclear reactor work, and how does it impact the nation’s energy production?
- What are the issues regarding nuclear reactor safety?
- What is radiation and how is it controlled?
- What is plasma and what are its uses?
- How do plasmas contribute to the field of medicine?
- How does a radiation detector work?
- What are some of the beneficial uses of radiation?

These questions are answered through lectures, hands-on activities, and team projects. Campers will see nuclear, plasma, and radiological engineering in practice through laboratory demonstrations and field trips such as:

- Measuring radiation using Geiger counters and other devices
- Seeing a mousetrap reactor simulate a nuclear reaction
- Experiencing radiation through a cloud chamber demonstration
- Touring a virtual nuclear reactor
- Using virtual and lab simulations to learn about radiation dosages, half-life, and shielding
- Observing confined plasma and interacting with a plasma ball
- Crushing cans to understand magnetic pressure in plasmas
- Touring HIDRA, NPRE’s unique plasma/fusion facility
- Touring a plasma nanotechnology facility and labs that make the machines that make semi-conductor chips
- Touring the radiological Instrumentation Laboratory
- Touring the soft robotics lab

2020 POWER OPTIMIZATION AND ENGINEERING  
*IDEA*: SUN 6/21/2020 – WED 7/1/2020

10th-12th grade

Our world is becoming more mobile, we demand higher performance from our devices and higher efficiency in moving around. This camp is a cross-discipline exploration of devices we use to move and communicate in this rapidly changing world. Work with and learn from the faculty, staff, and students of the Center for Power Optimization of Electro-Thermal Systems and Grainger Engineering’s Electrical and Computer Engineering Department.

Campers will use the best of their creative and problem solving skills for hands-on experiences designing and building machines and devices that will make the world more connected. Activities include:

- Designing a solar car and determining best methods to power cars of the future,
- Working in a university cleanroom laboratory to make a solar cell and phototransistor,
- Building an FM transmitter by laying out the parts of their circuit on a protoboard, determining their purpose, and then soldering together an FM phone to take home,
- Using logic gates to build an LED calculator circuit that adds numbers as high as 3 plus 3 and displays the result with light.

*IDEA* camps aim to increase the number of underrepresented populations pursuing STEM majors and careers

10th-12th grade

Everything is made of materials. From buildings to batteries, clothing to cars, we depend on materials for many things in our everyday life. Materials science and engineering (MatSE) is all about understanding the structure and properties of materials ranging from the atomic scale to the macro-scale. Then we learn how to process them to get desired performance in new and existing technologies. Advancements in our understanding of materials will enable next generation technologies for power generation and storage, transportation, sustainable packaging of foods and consumer goods, biomedical applications, and many, many others!

Materials science and engineering is a highly collaborative, interdisciplinary field. If you like math, physics, chemistry and engineering but can’t choose between them—MatSE is the perfect place for you explore all of these fields under one umbrella. Campers will explore this diversity through hands-on activities including guided lab activities aimed at introducing key concepts in MatSE and the opportunity to design a prototype based on materials properties that your team discovers. Camp topics might include:

- The Materials Science of Chocolate and Superheroes,
- Advanced manufacturing methods ranging from composite fabrication to casting to 3D printing of structural and functional materials,
- Biomaterials including prosthetics, bone scaffolding and cell mechanics,
- Crystallography via state-of-the-art characterization tools and modeling methods, and
- Materials for sustainable energy solutions including material life cycles, batteries and photovoltaics

**EAGER camps aim to increase the number of women and gender non-binary students pursuing STEM majors and careers**


EXPLORER: SUN 7/12/2020 – 7/18/2020

10th-12th grade

Mechanical Engineering is all about building things! Mechanical engineers understand how machines work and how to design and construct new ones to solve challenging problems in the world. This camp will explore many of the exciting new topics in mechanical engineering, such as:

- constructing 3D printers to make things
- building robots to explore and clean up hazardous waste
- creating prosthetics to help injured people walk again
- making water treatment systems that run on sunlight for the developing world

Campers will get hands-on experience building and designing machines that make the world a better place, using all their creativity and problem-solving skills. The camp will also include field trips to on-site labs and nearby research and manufacturing companies.

**EAGER camps aim to increase the number of women and gender non-binary students pursuing STEM majors and careers**
2020 DISCOVER ENGINEERING CAMP  
SUN 7/12/2020 – SAT 7/18/2020

9th-10th grade

Discover Engineering (DE) is a week-long, residential camp for rising freshmen and sophomores with a strong interest in math and science. Campers work on several projects that incorporate different aspects of engineering. Campers will visit various research labs around campus, become familiar with the different forms of engineering disciplines studied at the University of Illinois at Urbana-Champaign’s Grainger College of Engineering, and interact directly with faculty and students actively researching in these areas. This is a great way to gain a better understanding of engineering in general, as well as an increased understanding of the wide range of careers and areas of study available for engineers.

Learn about and experience:
- Aerospace Engineering
- Agricultural Engineering
- Bioengineering
- Chemical Engineering
- Civil & Environmental Engineering
- Computer Science
- Electrical & Computer Engineering
- Industrial Systems Engineering
- Material Science and Engineering
- Mechanical Science and Engineering
- Nuclear, Plasma, and Radiological Engineering

2020 AEROSPACE ENGINEERING CAMP  
**EAGER: SUN 7/19/2020 – SAT 7/25/2020

9th-12th grade

From tiny airplanes delivering packages to sending humans to Mars, today is an exciting time for everything related to Aerospace Engineering! This camp provides campers with the opportunity to explore aerospace engineering through numerous hands-on projects and demonstrations.

Utilizing individual and team activities, participants will investigate various aspects of this discipline comprising flight mechanics, aerodynamics, aerospace structures, orbital mechanics, and propulsion systems to then apply them to aircraft and spacecraft design. These topics will help the students answer questions such as:
- What keeps airplanes in the air during a flight?
- How are composite materials used to improve aircraft efficiency?
- What is needed to launch people and satellites into space?
- How do satellites stay in orbit around the Earth?

Camp activities include:
- Design, construction, and launch of model boost gliders and rockets.
- Attend classes and laboratory sessions led by graduate students and faculty working on cutting-edge research projects.
- Meet with guest speakers from the Aerospace industry. Past guest speakers included representatives of NASA, Northrop-Grumman, Orbital ATK, and JPL.
- Travel to the local airport where participants have the opportunity to take an actual flight in a small aircraft operated by the Institute of Aviation.

**EAGER camps aim to increase the number of women and gender non-binary students pursuing STEM majors and careers
Chemical engineering combines science and mathematics to produce useful materials. In most cases, a chemical engineer takes a scientific process or discovery and engineers it so that it can be made on a large scale. By making food, clothes, power, medicines, and plastic on a large scale, they are then more affordable for all of us!

Through lectures, hands-on activities, and team projects, campers experience activities such as:

- Working directly with engineering equipment such as distillation towers in a chemical plant or an extruder machine to make plastics
- Extracting DNA from fruits and vegetables and understanding how plants make food
- Using Silly Putty to understand the physics of fluids, computer games to understand protein folding, or chocolate to understand crystal formations
- Attending field trips to witness how chemical engineering topics apply to the real world and to talk with female engineers about what it's like to work in these locations

Past field trips have included:

- Lyondell Bissell Plant in Tuscola, IL
- Abbott Power Plant in Champaign, IL
Please remove your completed application from the booklet and return to your Danville High School Principal's office by 3:00 pm on Friday, February 21, 2020.
2020 ILLINOIS ENGINEERING SUMMER PROGRAMS – APPLICATION

General Application

What program are you applying for?

Please indicate your first and second choice below with 1 being most preferred and 2 being equally or just slightly less preferred. If space is unavailable in your first choice, we will place you in your second choice. Do not choose a 2nd choice if there are no other programs that interest you.

<table>
<thead>
<tr>
<th>Track</th>
<th>Session Dates</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>BIOENGINEERING CAMP (IDEA*) 9th – 11th Grade</td>
<td>June 14 – June 20, 2020</td>
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<tr>
<td>ELECTRICAL AND COMPUTER ENGINEERING CAMP (EAGER**) 10th – 12th Grade</td>
<td>June 14 – June 20, 2020</td>
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<tr>
<td>EXPLORING YOUR OPTIONS – Session 1 11th – 12th Grade</td>
<td>June 14 – June 20, 2020</td>
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<tr>
<td>COMPUTER SCIENCE &amp; ENGINEERING 9th – 11th Grade</td>
<td>June 21 – June 27, 2020</td>
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<tr>
<td>EXPLORING NUCLEAR, PLASMA &amp; RADIOLOGICAL ENGINEERING CAMP 11th – 12th Grade</td>
<td>June 21 – June 27, 2020</td>
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<tr>
<td>ILLINOIS AEROSPACE INSTITUTE CAMP 9th – 12th Grade</td>
<td>June 21 – June 27, 2020</td>
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<tr>
<td>POWER OPTIMIZATION AND ENGINEERING FOR MOBILITY (IDEA*) 10th – 12th Grade</td>
<td>June 21 – July 1, 2020</td>
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<tr>
<td>BIOENGINEERING CAMP (EAGER**) 9th – 11th Grade</td>
<td>July 5 – July 11, 2020</td>
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<tr>
<td>MATERIALS SCIENCE &amp; ENGINEERING CAMP (EAGER**) 10th – 12th Grade</td>
<td>July 5 – July 11, 2020</td>
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<tr>
<td>MECHANICAL SCIENCE &amp; ENGINEERING CAMP (EAGER**) 11th – 12th Grade</td>
<td>July 5 – July 11, 2020</td>
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<tr>
<td>DISCOVER ENGINEERING 9th – 10th Grade</td>
<td>July 12 – July 18, 2020</td>
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<tr>
<td>ILLINOIS AEROSPACE INSTITUTE CAMP 9th – 12th Grade</td>
<td>July 12 – July 18, 2020</td>
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<tr>
<td>MECHANICAL SCIENCE &amp; ENGINEERING CAMP 11th – 12th Grade</td>
<td>July 12 – July 18, 2020</td>
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<tr>
<td>AEROSPACE ENGINEERING CAMP (EAGER**) 9th – 12th Grade</td>
<td>July 19 – July 25, 2020</td>
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<tr>
<td>CHEMICAL ENGINEERING CAMP 9th – 12th Grade</td>
<td>July 26 – August 1, 2020</td>
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<tr>
<td>EXPLORING YOUR OPTIONS – Session 2 11th – 12th Grade</td>
<td>July 26 – August 1, 2020</td>
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</table>

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APPLICANT'S INFORMATION

First Name __________________________ Middle Name __________________________ Last Name __________________________ Preferred first name or nickname __________________________

MONTH | DAY | YEAR ____________

Date of Birth (Month, Day, Year) __________________________

Race:
○ American Indian or Alaska Native
○ Asian
○ Black or African decent
○ Native Hawaiian or Other Pacific Islander
○ White
○ None of the above
○ Prefer not to say

Race other than those listed
If you responded, "None of the above," please list your race here.

Ethnicity

Gender

Street Address

City __________________________ State __________________________ Zip __________________________ Country __________________________

(___) __________________________ Phone Type __________________________

Applicant's Primary Phone __________________________

Applicant's Email Address

School Currently Attending

What grade will you ENTER in the Fall 2020 school year?

Are you a returning participant?
○ Yes ○ No

If so, what year did you most recently attend?

What program did you attend?

PARENT/GUARDIAN #1 INFORMATION

First Name __________________________ Last Name __________________________ Relationship to applicant __________________________

(___) __________________________ Phone Type __________________________

Primary Phone __________________________

Secondary Phone __________________________

PARENT/GUARDIAN #2 INFORMATION

Danville Dist. 118

First Name __________________________ Last Name __________________________ Relationship to applicant __________________________

(___) __________________________ Phone Type __________________________

Primary Phone __________________________

School District

(217) 444-1065

(217) 444-1062

kuchefskib@danville118.org

Email Address

(217) 444-1065

Phone Type

Secondary Phone

Phone Type
TEACHER INFORMATION (for teacher recommendation form)

The following information will be used to contact the teacher, tutor, or counselor who will be completing your Recommendation Form. We highly recommend that this person be someone who can attest to your skills in math or science. Be sure to notify this person that they should expect an email from wyse@illinois.edu (mailto: wyse@illinois.edu) for this purpose.

What is the name of the person we should contact to complete your recommendation form?

( ) ______________________
What is their phone number?

What is their email address?
Enter a single, valid email address only

What is their relationship to this student?
I.e. algebra instructor, mentor

Provide a list of coursework in math, science, technology, and engineering.
Include grades – official transcripts are not required (example below):

For example:
Science: Biology: A
        AP Chemistry: B
Engineering: Intro to Engineering: B
Math: Algebra: B
        Geometry: A

High School GPA and scale
e.g. 4.3 on 5.0 scale

Check any of the following that are provided by your school:
☐ AP science or math course(s)
☐ IB science or math course(s)
☐ Engineering course(s)
☐ Computer science course(s)
☐ Honors course(s)
Statement of purpose essay
Please write in the space below an essay describing the impact that you hope this program (and the continued pursuit of an education in math, engineering and science) will have on your future. Describe why you want to attend. Please limit your essay to 500 words.

How did you hear about these programs?
Check all that apply:
☐ School announcement
☐ Teacher
☐ Counselor
☐ Community program leader
☐ Program participant
☐ Web search
☐ Social media

If you heard of these programs in some other way, please tell us how:

Please remove your completed application from the booklet and return with your parent | guardian recommendation to the Danville High School Principal's office for submission to the Educational Support Program Office no later than:

Friday, February 21, 2020
Danville District 118 2020 Summer Opportunity
University of Illinois at Urbana-Champaign Summer Camps
Parent Recommendation

Parent Name: ________________________________
Address: ________________________________
________________________________________
Phone: ________________________________

I, ________________________________, parent of ________________________________
recommend my student for the District 118, 2020 Illinois Summer Camp Program at the University of Illinois at Urbana-Champaign. I recognize this is a week-long residential (overnight) program. I believe ________________________________ is a responsible student and can be counted upon to represent District 118 in a positive manner.

Parent Signature ________________________________ Date: __________