ABOUT

The Molecule Maker Lab Institute brings together the fields of Chemistry and Artificial Intelligence as a collaborative force to the field of molecule making. The EWD team strives to make this research accessible to individuals of all ages through outreach initiatives. Our current curriculum encompasses work from all 4 research thrusts, and was co-created by trainees from each of these thrusts. In order to address the needs of both formal and informal learning environments, we tailor activities to suit **chemistry learners** (NGSS standards, core chemistry learning goals), or **molecule innovators** (inspiring exploration of a chemical workplace and AI technology).

MMLI RESEARCH THRUSTS

Thrust 1: AI-Enabled Synthesis Planning

Thrust 2: AI-Enabled Catalyst Development

Thrust 3: AI-Enabled Molecule Manufacturing

Thrust 4: AI-Enabled Molecule Discovery

We focus on incorporating:

FUNCTION FIRST CHEMISTRY

To improve chemistry education, a "function first" approach can be used by presenting practical applications and allowing students to experiment before teaching chemical structures and nomenclature. Students can then flip the switch to observe the chemical structure behind the functions.

HUMAN CENTERED DESIGN + SCIENCE EDUCATION

Human centered design (HCD) uses problem solving to address unmet needs for learners through iterations. We focus on the overlap between HCD and Science to address the needs of science learners in both formal and informal environments and cultivate a generation of **molecular innovators.**

CONTACT US

moleculemaker@illinois.edu

https://moleculemaker.org/education-outreach/

OR SCAN HERE

WAYS TO ENGAGE

EDUCATORS & PARTNERS

Atomic Cluster
One day visit
ex. Field trips, Cena y Ciencias

Enzyme Cluster
Week long immersive experience
Ex. Molecule Maker Camp

Peptide Cluster
Ongoing 6-8 week program
ex. After school programs

Design Your Own
- We can help create a program that fits your needs!
- We offer support& resources to help you run our activities yourself.

INVESTORS

Your funding can help our initiatives grow! Sponsor specific activities, or donate to our general cause.E-mail us at abdulla3@illinois.edu to discuss options.

Consider supporting and collaborating with MMLI as an Industrial Partner

MOLECULE MAKER LAB INSTITUTE

EDUCATION & WORKFORCE DEVELOPMENT TEAM

OUR MISSION

MAKE MMLI RESEARCH IN AI AND CHEMISTRY ACCESSIBLE TO ALL.

INSPIRE A GENERATION OF MOLECULE INNOVATORS.

CREATE A DIVERSE, INCLUSIVE, AND WELL-EQUIPPED GENERATION OF MOLECULE MAKERS

ILLINOIS NSF

MMLI EDUCATIONAL ECOSYSTEM

INITIATIVES

DIGITAL MOLECULE MAKER

Chemistry Learners | Molecule Innovators

The digital molecule maker (DMM) is a revolutionary tool that makes molecule design accessible to all individuals by presenting molecular structures in a block format. By selecting a beginning, middle, and end, you can create a unique color. Utilize the AI-generated wavelength predictions to achieve your desired target color, and then effortlessly switch to structure mode for observation.

MMLI IN A BOX: SUSTAINABILITY MISSION

Chemistry Learners | Molecule Innovators

A mailed out "to-go kit" of resources to explore our Digital Molecule Maker, the world of light and color, and put that knowledge to use to create your own solar cells! Educators will be presented with opportunities for professional development and training in human centered design to better incorporate those ideals into their own teaching with or without these kits. Kits can be tailored to chemistry learners or molecule innovators.

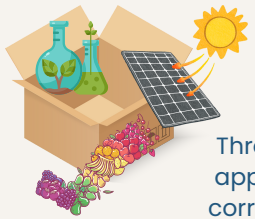
CURRICULUM & TRAINING

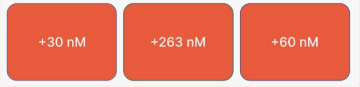
Chemistry Learners | Molecule Innovators

MMLI's research initiatives have made significant headway in the domains of AI and Chemistry. The EWD team collaborates with researchers to render their work accessible to individuals of all ages. In addition, MMLI offers teachers & educator training - currently during the Molecule Maker Camp and in conjunction with the upcoming MMLI in a box kit. The goal of the training is to help incorporate elements Molecule Innovation into both formal and informal learning environments via HCD and function first approaches.

"BLOCK" BASED CHEMISTRY

The structure/function feature of the DMM allows students to create molecules with a target in mind without needing to understand the chemical structure rules. Chemistry learners (or interested innovators!) can switch to the structure function to better understand why their function worked.Upcoming features including a visual representation of molecule colors and a new set of blocks representing organic solar cells.





FIRST, LEARN THE TOOLS:

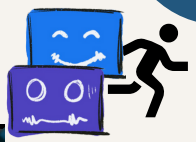
Through a block-based chemistry approach, using either the DMM or corresponding flashcards, students learn how light absorption creates perception of specific colors and create molecules of target colors.

THEN, APPLY THE TOOLS TO SOLVE A SUSTAINABILITY PROBLEM:

Students are tasked with making their own organic solar cells - something researchers in Thrust 4 are currently doing in their lab! Here, students use their knowledge of color and light absorption to identify which fruits or vegetables are the best at creating electricity via solar cells as a class!

MOLECULE MAKER CAMP

Students are immersed in the world of molecule making as they spend a week with the MMLI curriculum learning scientific and HCD tools to solve a problem. Educators are invited for a week long training that incorporates student observation..



MMLI ESCAPE ROOM

Molecule Innovators

Thanks to the students of the Escape Room Design course at UIUC, the MMLI experience is undergoing a unique transformation. The revamped version will be presented as an escape room, where participants will use molecular tools and AI to escape.

SHORT VISITS

We have worked with several partners to host students from the Champaign-Urbana community at UIUC, as well as visit other programs including "Cena y Ciencias" which provides a "Supper and Science" experience in Spanish to families from local 4-H schools.

AFTER SCHOOL PROGRAMS

Our weekly after-school programs serve as an introduction to our five-week curriculum, aimed at nurturing a scientific mindset in students as they engage in various outreach activities.

OUR PARTNERS

ChiS&E Chicago Pre-College Science and Engineering Program

WEEL Experience

ILLINOIS Worldwide Youth in Science and Engineering Program (WYSE) GRAINGER COLLEGE OF ENGINEERING

Cena y Ciencias Serving up science one meal at a time.

DREAAM

iExplore Illinois