



Science Coach

A C A D E M Y

***Incubating Ideas & Developing Knowledge
for Advanced Student Research***

*Professional skills building for teachers of 6th-12th grade
authentic research/innovation instruction.*

July 12-14, 2023

Jefferson College, Hillsboro MO

Welcome from the Executive Director

On behalf of Science Coach, I am pleased to welcome you to the 2023 Science Coach Academy. This year's theme is improving research topic ideas and research skills in a hands-on quality learning format. It is our goal to help you discover new ideas for student research projects, and we also recognize the importance of developing the knowledge that makes you an excellent research teacher. In the past we have provided this opportunity to the "Coaches" that are part of our Science Coach program, but this year we have opened this opportunity to other teachers as well. We are very happy to see you in person and encourage everyone to take advantage of the opportunity to share ideas, broaden your perspectives, and network with others.

We are so pleased that we have presenters who represent a wide array of expertise. I encourage you to join their sessions. Take the time to go through the program to identify those topics most relevant for your work and interests.

We know that your work in and out of the classroom has a lasting impact on the lives of your students. We hope that by providing this professional development opportunity we will share, to some small degree, in the important endeavor of educating the next generation of STEM professionals.

The Science Coach staff stands ready to help and advise you throughout the next few days. You will see them at workshops and helping to run this event. Don't hesitate to share your ideas or suggestions for future events. We would like to thank Jefferson College for letting us use this great facility for our event as well as our sponsors PEPCO and A.T. Still University. Their generosity has made this conference possible. If you are not familiar with Science Coach and all that we do, check out our website ScienceCoach.org. If you are interested in taking your research teaching to a whole new level, become a part of the 23-24 Science Coach PD!

We put together this program with conversations from our Coaches and survey input. At the end of this event, please complete our survey and help us make further improvements for next year.

And lastly, we want to thank our presenters who have graciously given of their time and exceptional knowledge in support of this event.

We hope you enjoy your experience here and learn a lot.

Sincerely,

Jill M. Ott

Executive Director, Science Coach



JILL OTT

*Science Coach
Executive Director*

Science Coach Board of Directors



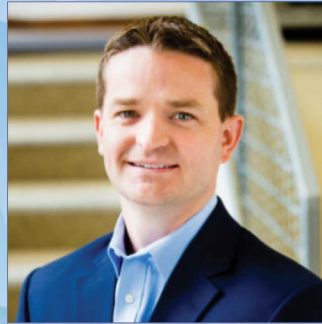
FRED SCHMIDT

*Board President
and Co-Founder*



DR. GARY STOCKER

Board Vice President



BEN JOHNSON

Board Member



DR. DAVID LAZENBY

Board Member



JAKE HERTENSTEIN

Board Member



MADHAV SUBRAMANIAN

Board Member



JOSAE NEPTUNE

Board Member

Science Coach Staff



SHAWN MORRIS

Program Coordinator



ALLAN WAMSLEY

*Manager of Products
and Strategic Initiatives*

Thank you to our Conference Sponsors



*PEPCO is a family-owned manufacturer
of quality science lab furniture
specializing in lab tables and stools
centrally located in the heart of Missouri..*

*Dependable service combined with fast
lead times and factory direct pricing
assures great value for our customers.*

ATSU | A.T. Still
University
FIRST IN WHOLE PERSON HEALTHCARE

Special Thanks



A special thank you to Jefferson College
for the use of their beautiful facility.

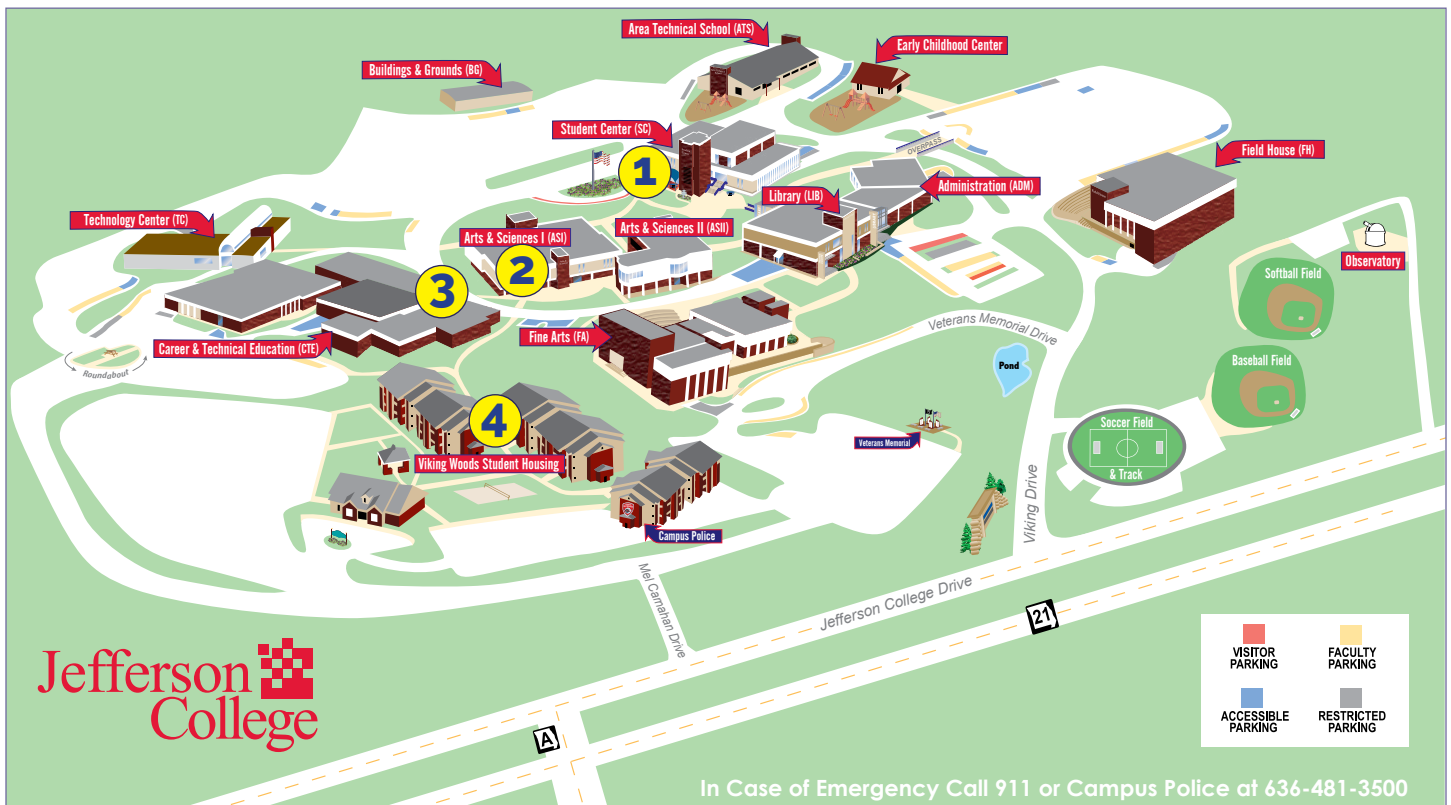
CONTENTS

Welcome from the Executive Director	1
Science Coach Board of Directors & Staff	2
Conference Sponsors	3
Local Stores	5
Housing	5
Jefferson College Campus Map	6
AIM Student	7
Complimentary Wireless Internet	9
Conference Learning Opportunities	9
Virtual Option	9
Pre-Conference Opportunities	10
Earn Graduate Credit from Lindenwood University	12
Science Coach Academy Conference	13
About Our Presenters	18
AIM Teacher	20

(within 5 miles of Jefferson College):

- 5 -

Jefferson College Hillsboro Campus Map



1 Student Center
(Viking Room on 1st Floor)



2 Arts & Sciences I (ASI)



3 Micro Mart
(Located in CTE Building)



4 Viking Woods Housing



AIM Student

Advanced Innovation Methodology

Guiding student researchers to scientifically ask and test questions they care about.

Advanced Innovation Methodology for Students

There are always students who are hungry for a challenge and love science or inventing. By using AIM Student, they learn the skills for developing an authentic scientific research project.

Whether taught by an instructor at their school or by one of our experienced, successful Coaches, students learn about the pursuit of scientific knowledge when investigating their own scientific questions.

- ✓ Students are successful at regional, national, and international scientific competitions, winning over a million dollars in scholarships and prize money.
- ✓ Lessons directly tie to students' personal research projects, increasing relevance to the student.
- ✓ An interdisciplinary approach incorporates multiple subjects into student-specific, project-based learning.
- ✓ The Canvas Learning Management System provides easy online access including Canvas's mobile app.

AIM Student is an online course with two great use options-

- 1) Students can apply to take our year-long course taught by an experienced coach.
- 2) A school can purchase student licenses for their teacher to use.

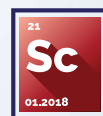
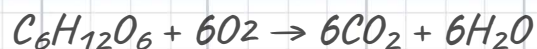
When **students**
want to take
Science or
Inventing
to the **next level**,
they need
AIM Student.

STUDENTS IMPROVE:

Creative Thinking
Critical Thinking
Ethical Reasoning
Inquiry & Analysis
Problem Solving
Written Communication
Oral Communication
Information Literacy
Foundations & Skills for Lifelong
Learning & Quantitative Literacy

LOGBOOK

08/27/2019



Science Coach®
EDUCATE • INNOVATE • ACHIEVE

314-501-1940 | sales@sciencecoach.org
4340 Duncan Ave., Suite 100, St. Louis, MO 63110



THERE ARE 14 MODULES & OVER 50 LESSONS IN THIS YEAR-LONG COURSE.

Introduction to Innovation
Introduction to Research
Developing a Research Question
Conducting a Literature Review
Research Ethics and Integrity
Study Design I
Study Design II

Conducting Your Experiment
Data Analysis Using Descriptive Statistics
Data Analysis Using Statistical Analysis
Results & Conclusions
Writing a Scientific Paper
Presenting Results
Reflection

Individual Program:

AIM Online Research Class:

- Includes the curriculum and student activities.
- An experienced Science Coach teacher leads the curriculum and provides live project assistance.
- Students will complete the online lessons and participate in live classroom activities to assist them as they develop their projects.

The Science Coach provides:

- ◆ Support for research topics
- ◆ Assistance with research design
- ◆ Help with technical questions
- ◆ Weekly live class meetings via Zoom for 1.5 hours
- Students receive a grade and completion certificate at the end of the course. *(This is currently not a dual credit/enrollment course. The grade nor credit will apply to your high school transcript. A formal certificate from Science Coach will be provided at the end of the course.)*
- The Science Coach Teacher manages the student's progress with support from the local adult in charge.
- Science lab access is available.

EARLY REGISTRATION:

\$1,150 Per Student Per Year

(Early registration ends May 31 for the 2023-24 School Year – enrollment between May 31-July 1 is \$1,250. Classes begin August 14th.)

AIM Student Options Available for Home or Co-op based learning. Contact sales for more details.

School Program:

- Licensed by school for classroom student use
- Includes the curriculum and online student activities
- The school's teacher leads the curriculum and provides live project assistance.
- Fully customizable and aligned with AIM Teacher
- Use valuable classroom time for project research development

Annual \$300/Student

When bundled with AIM Teacher (\$2,500/yr), AIM Student is discounted to \$250/Student.

BEGIN YOUR RESEARCH JOURNEY TODAY!

EMAIL

sales@sciencecoach.org

CALL

314-472-3302

VISIT

ScienceCoach.org



Complimentary Wireless Internet

There is complimentary wireless internet in all academic buildings. The Jefferson College public access point **JeffcoWiFi** does not require a password. One must agree to the terms and conditions before use.

Conference Learning Opportunities

- Develop a list of age-appropriate research project ideas from various STEM fields.
- Enhance one's skills to refine research ideas into testable research questions.
- Improve one's capability to complete ISEF required paperwork.
- Develop a list of research contacts and expand your research teacher network.
- Expand one's knowledge of advanced statistical tools and measurements.
- Sharpen your ability to conduct and write literature reviews.
- Expand your knowledge about scientific databases.
- Learn how to use and edit AIM Teacher and Student in the Canvas Learning Management System (LMS).
- Learn about Chat GPT and opportunities to use AI in project development and refinement.
- And much more...

Virtual Option

If you would like to participate remotely, you can do so by using Zoom.

Only select sessions are available via the [Zoom link](#).

The sessions are identified in the program, they will have a  icon next to the session.



SOCIAL MEDIA

Stay in touch with the Science Coach Academy and other attendees throughout the conference and use

#Academy2023

to join the conversation!



@ScienceCoachOrg



ScienceCoach



Pre-conference Opportunities

WEDNESDAY, JULY 12

There are two pre-conference opportunities. One is only for teachers new to the Science Coach program. This pre-conference opportunity will be a continuation of the online-training provided in Canvas. Registration is limited to those teachers who are new and a part of the Science Coach Professional Development program.

The other opportunity is for existing Coaches and those attending the Academy that are not currently part of the Science Coach program. This day-long session will be held at the Donald Danforth Plant Science Center. More details are provided below.

Check in for those staying at Viking Woods Student Apartments the night before the pre-conference will be Tuesday, July 11 from 4–7:30 PM at the Viking Woods Clubhouse. Make sure you check the list of items to bring if staying at Viking Woods.

1

Donald Danforth Plant Science Center

975 N Warson Rd, Olivette, MO 63132

9 AM – 3 PM

Must register in advance. The cost for attending this session is \$250.

A shuttle van will be available outside the Viking Woods Club House for those participants who are staying overnight at Viking Woods. The van will leave at 8 AM to transport guests to the Donald Danforth Plant Science Center.

Arrive at the Donald Danforth Plant Science Center by 9 AM.

(975 N Warson Rd, Olivette, MO 63132)

Parking is free and on the east side of the building. Proceed to the main lobby and sign-in. A Donald Danforth staff member and/or Science Coach staff member will be in the lobby to direct you to the appropriate room.

Description: This session will provide information on authentic research experiences for students including work on Mutant Millets, Volvox development, and corn Genotype to Phenotype. Participants in these programs engage in authentic research by gathering data in conjunction with the Danforth Center. Participants may choose to adjust the activities to create their own authentic research project. Participants in these projects are provided free resources to conduct experimentation. Hear from select Principal Investigators and Postdoctoral staff at the Center about their research and visit BRDG Park facility (next door to the Danforth Center). Take a tour and participate in hands-on opportunities using select lab equipment. Also learn from Danforth staff about possible student internship opportunities at the Center.

Pre-conference Opportunities

WEDNESDAY, JULY 12

2

New Science Coach Orientation

Jefferson College Arts & Sciences Building (ASI), Lecture Hall 2

This day-long session is ONLY for new Coaches and is a continuation of the online instruction completed in Canvas prior to this event. It is part of the Science Coach Program Professional Development series for teachers new to the program. This session is an intensive introduction to topics vital to leading authentic research courses. There is no cost to participants, and registrants will be compensated \$100 for attendance.

8:30 AM	Sign-in Name Tags & Continental Breakfast <i>(ASI Lecture Hall 2)</i>
9 AM	Science Coach Introduction, Schedule, and Helpful Information (Snack Bar, etc.) <i>Ms. Jill Ott</i>
9:30 AM	Participant Introductions
9:45-10:30 AM	AIM Teacher and Canvas Overview <i>Ms. Jennifer Hess & Ms Jill Ott</i>
10:30-10:45 AM	Break (Refreshments provided in the Lobby)
10:45 AM-12 PM	Topic/Project Idea Refinement <i>Ms. Jennifer Hess</i>
12-12:45 PM	Lunch
12:45-1:45 PM	ISEF Application <i>Ms. Jennifer Hess</i>
1:45-2 PM	Break (Refreshments provided in the Lobby)
2-2:30 PM	Labfolder Overview <i>Ms. Christina Jurotich</i>
2:30-3:30 PM	Portal Training <i>Ms. Jennifer Hess & Ms. Shawn Tatom Morris</i>
3:30-4 PM	Final Q&A <i>Ms. Jennifer Hess & Ms. Jill Ott</i>

Pre-conference Opportunities

EVENING – WEDNESDAY, JULY 12

Main Conference Check-In for those staying at Viking Woods

4-7:30 PM, Viking Woods Clubhouse

BBQ Dinner

5-6 PM, Viking Woods Pavilion

Earn Graduate Credit!

Earn 1 graduate credit from Lindenwood University for attending The Science Coach Academy, or you can earn 2 graduate credits for attending and writing a 5-page analysis paper.

LINDENWOOD
UNIVERSITY

To earn the credit you will need to complete an application and submit it to Lindenwood University. There is a \$75 per credit hour posting fee.

If you need any assistance with enrollments | grades | transcripts | timelines, please visit www.lindenwood.edu (PACE Frequently Asked Questions/Academic Terms), or email Lindenwood at pace@lindenwood.edu.

Science Coach Academy Conference

THURSDAY, JULY 13

8-8:45 AM **Breakfast & Sign-in**
Student Center - Viking Room (located on first floor)

8:45-9 AM **Welcome and Introductions**

9-10 AM **MAIN SESSION** *Student Center - Viking Room*



Invasive Species Control on Native Grasslands: Research Discoveries and Knowledge Gaps – *Student Center-Viking Room, Ms. Malissa Briggler*

This session will outline research on *Sericea lespedeza* and sumac control, including study design and questions. Malissa will share highlights from her research and important questions that still need to be pursued by future research.

10-10:30 AM **Break & Transition to the Arts and Science I (ASI) Building**

10:30-11:30 AM **BREAKOUT SESSIONS** *Arts & Sciences I (ASI) Building*

Psychology Research Methods – *ASI 239, Dr. Brandon Whittington*

In this session the differences between correlational and experimental designs as well as quantitative vs. qualitative data will be discussed. Different data analysis and statistical testing techniques will be explored.

Introduction to ISEF Forms – *ASI 207, Ms. Jennifer Hess*



There are multiple forms required for students to participate in ISEF-affiliated fairs, as well as to move on to ISEF. This session will help you decode who needs what form and when they must be filled out.

11:30-11:45 AM **Break & Lunch Pick-up** – *ASI Lecture Hall 3*
Participants will pick up their Panera box lunch from the station outside the Lecture Hall 3. Lunch seating is available in Lecture Hall 3.

11:45 AM-Noon **Information From PEPCO**
Pepco is a family-owned manufacturer of quality science lab furniture specializing in lab tables and stools centrally located in the heart of Missouri.



Arts & Sciences I (ASI) Lecture Hall 3

Noon – 1 PM **The Basics of Writing a Literature Review** – *ASI Lecture Hall 3, Mr. Arjun Nair*



This presentation will provide an introduction to the key components of a literature review, the steps to start your own review, and some helpful tips to communicate this information to your students.



1-1:45 PM

BREAKOUT SESSIONS *Arts & Sciences I (ASI) Building*

Publishing Student Research – ASI 106, *Mr. Ryne Emerick*

This session will provide information on the processes for publishing student research. Mr. Emerick has had several students publish their research and will provide details on processes, timelines and recommendations.

Honeybee Colony Loss Due to the Varroa Destructor: Relevant Research and Possible Areas for Student Exploration – ASI 117, *Dr. Jim Masucci*



Because of their portability, honeybees are an integral part of our food production. Yet, beginning in 2006 and continuing today, beekeepers have been experiencing 30-40% colony losses annually. The major culprit in these losses is the mite *Varroa destructor*, first detected in the US in the late 1980's. This devastating mite, which both weakens the bees' immune system and vectors viruses, is or will be present in every colony. These infestations, in conjunction with other honeybee stressors, are the cause of the high rates of annual colony losses. Dr. Masucci will introduce you to the honeybee, put into perspective why mites are so dangerous to the colony, talk briefly about some mite research, and then present some areas that he believes could be explored by students interested in honeybees.

Dealing With Projects Requiring ISEF Pre-Approval – ASI 101, *Ms. Jennifer Hess*

Certain projects require multiple rounds of approval before being eligible to compete at an ISEF-affiliated fair. This session will delve into the details of this topic so you can avoid mistakes that may make a project ineligible for competition.

2-2:45 PM

BREAKOUT SESSIONS *Arts & Sciences I (ASI) Building*

Taking a Project Idea and Refining it into a Testable Question – ASI 101, *Ms. Jennifer Hess*

This workshop will focus on helping students take a broad or vague idea and distill it down to a testable question with a reasonable scope.

Psychology Research Discussion and Ideas – ASI 102, *Dr. Brandon Whittington*



This session will explore ideas for psychology research projects and will discuss specific research resources for refining those ideas.

Engineering Research Topics From the Association of Graduate Engineering Students (AGES) – ASI 106, *Ms. Suzanne Russo*

This session will be led by a student from Washington University AGES program. It will focus on an engineering topic in the student's area of research interest.

2:45-3 PM

Break – Drinks and snacks are provided in the ASI hallway.

3-3:45 PM

BREAKOUT SESSIONS *Arts & Sciences I (ASI) Building*

2023 is the Year of Open Science: Scientific Database Resources – ASI 102, *Ms. Lisa Pritchard*

This session will highlight the increasing number of federal agency websites and databases that contain free access to a growing body of data, data sets, and scientific research. This session will also introduce library databases that provide science journal access, reference sources, and general interest magazine articles that can be used as part of the research for science projects or by educators helping students learn about science.



Using AIM Teacher and Student in Canvas – ASI 101, *Mr. Allan Wamsley*

AIM Teacher and Student are available to the "Coaches" in the Science Coach program. It is also available for purchase by schools wanting to use this curriculum. This session will be an introduction to the Canvas learning management system and will show teachers how to access AIM Teacher and Student and make it available to their students. The AIM content is fully customizable. Information will be provided on how to make basic edits and use the gradebook.

Science Coach Academy Conference

EVENING - THURSDAY, JULY 13

Villa Antonio Winery

3660 Linhorst Rd. Hillsboro, MO. 63050

5 & 5:30 PM

Shuttle Service

Participants are welcome to drive to the Villa Antonio Winery for dinner, or they can take advantage of the shuttle van.

The van will be leaving from the Viking Woods Clubhouse at 5 & 5:30 PM.

A return shuttle will run at 8 & 8:30 PM.

6:00-8:30 PM

Networking & Dinner at Villa Antonio Winery (Sponsored by A.T. Still University)

An Italian themed dinner complimentary beer and wine will be provided.






villaantoniowinery.com



Science Coach Academy Conference

FRIDAY, JULY 14

- 8 AM **Continental Breakfast**
Arts & Sciences I (ASI) Lobby
- 8:30-9:30 AM **MAIN SESSION**
ASI Lecture Hall 3
- Medical Laboratory Science Research Project List** – ASI Lecture Hall 3, *Dr. Gary Stocker* 
Dr. Stocker will present a list for discussion and review of important MLS topics that have been solicited from a diverse group of medical laboratory professionals.
- 9:30-10:30 AM **BREAKOUT SESSIONS**
Arts & Sciences I (ASI) Building
- Introduction to Statistics** – ASI Lecture Hall 3, *Dr. Mary Kilmer*
Learn the basics of statistical analysis, including how to incorporate it into the scientific process. This workshop will discuss the importance of hypothesis development, statistical data analysis, and how to interpret statistical values. Terminology related to statistical analysis will be covered as well as types of the most common statistical tests.
- Enhancing High School Research with AI:
Exploring the Potential of ChatGPT** – ASI 101, *Mr. Ryan Emerick* 
Learn about how ChatGPT might be used in enhancing and exploring authentic research topics. Mr. Emerick has been exploring this new tool and will demonstrate some of its potential.
- 10:30-10:45 AM **Break** - Refreshments available in the ASI Lobby
- 10:45-11:45 AM **BREAKOUT SESSIONS**
Arts & Sciences I (ASI) Building
- How to Determine the Best Statistical Test** – ASI 101, *Dr. Mary Kilmer* 
Participants will learn how to determine the best statistical test for their data based on experimental questions, hypothesis(es), and types of data collected. A discussion of assumption tests for normality and variance will be included. This session will be computer based.
- Modifying AIM Teacher and Student in Canvas** – ASI 102, *Mr. Allan Wamsley*
Teachers will gain confidence in their ability to add their own content and modify existing content in AIM Teacher and Student. These learning materials are hosted in the Canvas learning management system. The Canvas quiz feature, among other tools, will be discussed.
- 11:45 AM-Noon **Break & Pick-up Lunch**
Participants will pick up their Subway box lunch from the station outside the Lecture Hall 3.



Science Coach Academy Conference

FRIDAY, JULY 14

Noon–1 PM

The Good, the Bad, and the Ugly in Presenting Scientific Research



ASI Lecture Hall 3, *Dr. Teresa Boman*

Even the best of science can be lost in translation through a poorly constructed presentation. This session will provide tips and tricks to make sure that your student researcher's time and hard work are not underrecognized due to a simply not presenting it well. We will focus on flow, format, etc. for construction of an effective oral presentation through the use of a slide show.

1:15 – 2 PM

BREAKOUT SESSIONS

Arts & Sciences I (ASI) Building

Using Software for Statistical Analysis – ASI 101, *Dr. Mary Kilmer*

This session will utilize a free, publicly available software program (PAST) to carry out statistical data analysis. Participants will learn how to correctly enter data, perform statistical tests, and interpret the final output values in a statistically appropriate way. This session will be computer based.

Astronomy Research Project Ideas – ASI Lecture Hall 3, *Ms. Kalee Tock*



Ms. Tock will be presenting on her experience leading student astrological research for Stanford's Online High School. She will be providing information on approaches to research at this level and will be discussing possible project topic areas.

2–2:15 PM

Break - Drinks and snacks are provided in the ASI Lobby.

2:15–3 PM

Closing Session – ASI Lecture Hall 3, *Ms. Jill Ott & Ms. Shawn Morris*



Information will be provided on Science Coach opportunities for teachers and students. Updates will be provided to existing Coaches and a conference survey will be provided.

3–4 PM

Viking Woods Checkout – *Viking Woods Clubhouse*

Staff will be available from Science Coach and Jefferson College to complete check-out procedures for Viking Woods student housing. The checkout will occur in the Viking Woods Clubhouse.



About Our Presenters

Dr. Teresa Boman

Associate Professor of Biology and Environmental Health, Director of the Environmental Health and Safety Program, Missouri Southern State University.

Dr. Teresa Boman is an Associate Professor of Biology and Environmental Health at Missouri Southern State University. She has been teaching at MSSU for ten years. She also serves as the regional co-director for the Missouri Junior Academy of Sciences (Southwest region) and the state co-director for the Missouri Junior Academy of Sciences. She enjoys research and is currently focused on microplastics in Missouri's waterways. When not at work, she likes to spend time with her four kids and husband on the family farm.

Ms. Malissa Briggler

Missouri Department of Conservation - State Botanist

Malissa Briggler has worked for the Missouri Department of Conservation first as a Grasslands Botanist, then as State Botanist. Over the past 15 years, her research has included projects that investigated methods to control *Sericea lespedeza* and sumac on native grasslands. Her graduate studies focused on herbicide methods to control smooth brome with minimal impact to native prairie forbs.

Mr. Ryne Emerick

Teacher - Lebanon High School

Ryne Emerick is entering his 14th year of teaching at Lebanon High School, MO. He received his Bachelor of Science degree in Wildlife Management from the College of the Ozarks and went on to earn his Master of Science in Biology from Southern Illinois University Edwardsville.

Throughout his teaching career, Ryne has taught a variety of subjects including physical sciences, life science, and environmental science. He is particularly passionate about guiding students through independent research projects, which have resulted in success at local, state, and international science fairs. His students have also published their research in various student journals.

Ms. Jennifer Hess

Teacher/Department Chair at Wentzville Holt High School

Ms. Hess has taught science at Holt High School for 24 years and currently serves as the department chair. She is the assistant National Honor Society sponsor and has been actively involved with Science Coach as a Head Coach, presenter and consultant. She was recently named an Advanced Science Research Teaching (ASRT) Program Semi-Finalist. She is the director of the Missouri Tri-County Regional Science and Engineering Fair and the co-director of the Missouri Junior Academy of Science, St. Louis regional competition. She has spent much of her professional career creating opportunities for high schoolers to become involved in real-world scientific research, and has seen many of her students become research scientists, physicians, nurses, veterinarians, engineers, and seek countless other professions in fields of science. Her students through the years have won numerous awards at ISEF and other scientific competitions.

Dr. Mary Kilmer

Associate Professor of Biology and Environmental Health-Missouri Southern State University

Dr. Mary K. (Katie) Kilmer is an Associate Professor of Biology and Environmental Health at Missouri Southern State University. She also serves as the regional co-director for the Missouri Junior Academy of Sciences (Southwest region) and the state co-director for the Missouri Junior Academy of Sciences. She enjoys the challenge of making daunting topics, such as statistics, more accessible and enjoyable for all.

In her free time, Dr. Kilmer enjoys reading, spending time with her family and tending to her beehives.

Dr. Jim Masucci

Owner JDM Bees

As a honeybee researcher, Jim ran some of the largest field trials ever to develop a new varroa control product for Monsanto/Bayer. This experience allowed him to work with some of the top commercial beekeepers in the US and Canada. He recently retired to focus full time on his honeybee business where he is up to ~200 hives. His business focusses mainly on nucs and honey, but the lure of pollination is always present. He continues to consult and run field trials for Greenlight Biosciences in their effort to bring an RNAi-based varroa control product to the market. The work with Greenlight keeps him in close contact with his commercial beekeeping friends.

Mr. Arjun Nair

Mr. Nair is a student at Washington University in St. Louis and is pursuing a B.A. in Biology with a minor in History. He has been a volunteer with Science Coach since 2021. He is the co-president of Synapse, Washington University's largest neuroscience educational and outreach program. He co-founded the "Diversity in Cancer Research" summer research program for high school students in Missouri that is partnered with Science Coach. Arjun is currently working in Dr. Limbrick's lab in the Neurosurgery Department at Washington University's Medical School studying surgical treatments and genetic causes of hydrocephalus.

Ms. Lisa Pritchard

*Director of Library Services- Jefferson College
Federal Depository Library Program Coordinator*

Ms. Pritchard is a reference and government information librarian with experience teaching research skills to college students, community members, and faculty and staff. She has collaborated with the St. Louis Astronomical Society, NASA, the Space Science Institute, campus faculty, citizen scientist programs, and community groups on a wide variety of science related programs.

Ms. Suzanne Russo

Wash U. - AGES

Ms. Russo is a PhD student in the Institute of Materials Science and Engineering at Washington University. She is studying the deformation behavior of metallic glasses, which are amorphous metals. She is interested in using computer simulations to determine the geometry of atomic clusters within the glass, and their role in mechanical behavior. She is also interested in 3D printing and its applications.

Dr. Gary Stocker

Adjunct Faculty Lindenwood University & Consultant

Dr. Gary Stocker has substantial business experience in healthcare and higher education, skills in sales and marketing, management, consulting, operations, and technology. Majoring in medical technology at Eastern Illinois University, he earned a Master's degree in healthcare management and leveraged that education to manage quality and statistical operations for a 2-hospital system in St. Louis. His 2010 doctoral dissertation addressed the technology acceptance of electronic medical records by nurses.

Ms. Kalee Tock

Instructor Stanford Online High School

Kalée Tock earned her B.S. in Chemistry from Harvard University, and an M.S. from the Stanford University Department of Chemistry. She then earned a second Master's degree in Learning, Design, and Technology from the Stanford School of Education. She has been a science instructor at Stanford Online High School for 11 years, teaching Astronomy for the most recent 6 of those years. She now teaches three different Astronomy courses there: Astrophysics, Astrobiology, and an Astronomy Research Seminar.

Mr. Allan Wamsley

Manager of Products and Strategic Initiatives

Mr. Wamsley leads Strategic Planning and implementation, is responsible for sales and business partnerships, coordinates professional development opportunities for Coaches, provides marketing leadership, and is responsible for AIM products on Science Coach's learning management system. Allan has over 30 years experience in higher education. In his most recent role, he was Dean of Academic Services and Integrated Planning at a two year transfer and technical College.

Dr. Brandon Whittington

Assistant Professor of Psychology - Jefferson College

Brandon Whittington earned an A.A. from Rend Lake College, a B.A. from Greenville College, an M.A. from Eastern Illinois University, and both Ed.S. and Ph.D. degrees from the University of Missouri-St. Louis. Dr. Whittington is a nationally certified psychologist and a licensed professional counselor in the state of Missouri. Prior to joining the faculty at Jefferson College, Dr. Whittington practiced as a school psychologist and a professional counselor in several public school districts and community mental health settings. Dr. Whittington's research interests include the psychology of religion and the scholarship of teaching and learning. He regularly presents his work at local and national conferences and involves Jefferson College students in the research process, both as participants and student researchers.



AIM Teacher

Advanced Innovation Methodology

Detailed Lessons Supporting Advanced Authentic Research/Innovation Instruction

Who has time to create their own lesson plans on how to teach research methods? NO ONE! That's why you need AIM Teacher!

Advanced Innovation Methodology (AIM) Teacher provides detailed lessons and associated content for teaching advanced authentic research and innovation. It is primarily designed for secondary students, but has also been used for lower grade levels. Its features include:

- Step-by-step downloadable/modifiable lesson plans, rubrics, classroom activities, and associated instructional materials.
- Content built around the NGSS 5E Model of Instruction and mapped to NGSS Science and Engineering Practices (SEP) and Cross Cutting Concepts (CCC).
- Clear objectives and timelines to guide student innovators to successful science research projects.
- Deployed via Canvas at your school, or through our Canvas installation

Organized Research Teacher Instruction Made EASY

Ideal for:

- Curriculum for dedicated research classes, Gifted Programs, after school clubs, or for existing classes that feature independent research projects
- Framework for invention education instruction

AIM Teacher and AIM Student are better together.

AIM Student contains all of the student-facing content that aligns with AIM Teacher and is implemented in Canvas, including:

Aligned lesson objectives • Independent learning
Auto-graded assessments

Cost

AIM Teacher
\$3,000/license/Year

AIM Student
\$300/license/Year

AIM Classroom
AIM Teacher \$2500+
AIM Student \$250/
license

For Purchasing & More Information:

sales@ScienceCoach.org

"As an experienced research teacher, I find AIM Teacher very helpful because it organizes instruction into easy to use modules that can be used independently or in sequence. I wish I had this when I started teaching!" – Jennifer Hess, Wentzville, Holt High School



Science Coach
EDUCATE • INNOVATE • ACHIEVE

314-501-1940 | info@ScienceCoach.org
4340 Duncan Ave., Suite 100, St. Louis, MO 63110



Science Coach is a non-profit education provider that also offers year-long, job embedded professional development and advanced authentic research programming for 6th-12th grade teachers and students from U.S. public, private, and homeschools. We are creating the next generation of STEM professionals. Experienced teachers ready for the next level can [apply for our Science Coach PD program](#).

AIM Teacher and AIM Student Modules

Module 0: Introduction to Innovation

- Creativity and Innovation
- Working within a Team
- Characteristics of Innovators
- Design Thinking

Module 1: Introduction To Research

- Why Conduct A Research Project
- Exploring Science Competitions
- Scientific Research Changes The World
- Sharing Research Findings
- Where Can Research Be Conducted?

Module 2: Developing A Research Question

- Creating A Logbook
- What Makes A Good Research Question
- Research Questions Around School, In Nature And Everywhere
- Create Your Research Question
- Finding A Mentor

Module 3: Conducting A Literature Review

- What Is Scientific Literature
- What Is A Literature Review
- Literature Review Databases
- Potential Problems With Literature Reviews
- Conducting Your Literature Review
- Writing Your Hypothesis

Module 4: Research Ethics & Integrity

- Intro To Ethics And Integrity In Research
- Ethical Issues With Living Beings
- Ethical Issues With Handling Information
- Governing Bodies Of Ethics
- Ethical Scenarios

Module 5: Study Design I

- Types Of Variables
- Writing A Procedure
- Quantitative And Qualitative Studies
- Mixed Methods Study Designs
- Designing Quantitative And Qualitative Studies
- Study Design Implementation
- Student Presentations

Module 6: Study Design II

- Types Of Qualitative And Quantitative Studies
- Observational And Survey Study Designs
- Surveys And Focus Groups
- Applying Observational, Survey And Focus Group Study Designs
- Correlation And Causation
- Correlation Study Design
- Quasi-Experimental — Experimental Study Designs
- Applying Experimental Study Designs
- Designing Your Experiment

Module 7: Conducting Your Experiment

- Bias And Sample Sizes
- Designing Your Data Collection
- Materials Lists And Laboratory Safety
- Aseptic Technique And Sterile Workspaces
- Refining Your Procedure
- Carrying Out Your Procedure

Module 8: Data Analysis Using Descriptive Statistics

- Descriptive Statistics
- Applying Real World Data
- Analyzing Data Using Google Sheets
- Analyzing Real World Data Using Google Sheets

Module 9: Data Analysis Using Statistical Analysis

- Introduction To Statistical Analysis
- p Values
- Significance Testing, T-Tests
- Chi Square
- Linear Regression
- Analysis Of Variance Test (Anova)
- Applying The Appropriate Tests
- What Bad Statistics Can Do

Module 10: Results & Conclusions

- Constructing Graphs
- Applying Data Organizational Skills
- Interpreting Graphs
- Developing A Conclusion And Discussion
- Developing Your Conclusion And Discussion

Module 11: Writing A Scientific Paper

- Parts Of A Scientific Paper
- Writing A Scientific Paper
- Literature Review, Procedures, And Materials
- Results, Discussion And Conclusion
- References And Apa Format
- Abstracts

Module 12: Presenting Results

- Creating Your Presentation Or Demonstration
- Creating Your Speech
- Using Props And Visual Aids
- Speaking Techniques
- Practicing Your Speech
- Presenting Your Project Virtually

Module 13: Reflection

- Successes And Failures
- Future Goals
- Making A Plan To Continue This Project For Next Year's Research

**AIM Teacher development was graciously supported by the Tracy Family Foundation, The Saigh Foundation and the Science Coach Benefactors.*



Science Coach®
EDUCATE • INNOVATE • ACHIEVE

314-501-1940 | info@ScienceCoach.org
4340 Duncan Ave., Suite 100, St. Louis, MO 63110

NOTES



Science Coach®
EDUCATE • INNOVATE • ACHIEVE

4340 Duncan Ave., Suite 100
St. Louis, MO 63110

314-501-1940 | ScienceCoach.org

A collaborator with BioSTL

Since 2007, the Science Coach (ScienceCoach.org) non-profit has been engaging 6th-12th grade students to experience completing a scientifically accurate research project that solves a problem important to them. We work through schools to intentionally upgrade research teachers' skills providing extensive professional development and a comprehensive support ecosystem that results in 89% of the students choosing STEM careers.

6.26.23