



Academy of Applied Science



54th Annual

Southeastern Michigan

**Junior Science and
Humanities
Symposium**

Program
2018

**WAYNE STATE
UNIVERSITY**

**McGregor Memorial Conference Center
Detroit, Michigan**

March 9th, 2018

54th Annual

SOUTHEASTERN MICHIGAN

**JUNIOR SCIENCE AND HUMANITIES
SYMPOSIUM**

Friday, March 9th, 2018

SPONSORED BY

**WAYNE STATE UNIVERSITY
College of Education**

In cooperation with

U.S. Army Research Office - Research Triangle, NC

U.S. Naval Research Office

U. S. Air Force Research Office

U.S. Army Tank - Automotive Command
Research, Development, and Engineering Center
Warren, MI

Academy of Applied Science - Concord, New Hampshire

National Association of Secondary School Principals

OBJECTIVES OF THE JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM PROGRAM

- 1. To promote research and experimentation in the sciences, mathematics and engineering at the high school level.*
- 2. To recognize the significance of research in human affairs and the importance of humane and ethical principles in the applications of research results.*
- 3. To search out talented youth and talented teachers; recognize their accomplishments at symposia and encourage their continued interest and participation in the sciences, mathematics, and engineering.*
- 4. To expand the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities.*
- 5. To increase the number of future adults capable of conducting research and development.*

In order to accomplish these objectives, we enlist the active participation of our local communities in improving the education of our children.

Publishing Opportunity

Students who submitted a paper for presentation at this year's JSHS are encouraged to submit their paper for publication in JOURNEYS – *Journal of Youths in Science*. Students planning to submit their paper for publication should first consult with their research mentor(s) and anyone else who collaborated in their research.

Before submitting a paper for publication in JOURNEYS students should check the journal's website at <http://www.journys.org/> and closely follow the instructions under "Submission."

ADMINISTRATION OF JSHS

Dr. Sandra Yarema, Director and Coordinator of JSHS
Assistant Professor and Coordinator of the Science Education Program
College of Education, Wayne State University

JSHS ADVISORY BOARD

Dr. Monica Brockmeyer
Associate Provost Academic Success
VP Academic Affairs
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Dr. Christine Chow
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College of Liberal Arts and Sciences
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Professor
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Dr. Stanislav Groysman
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Wayne State University

Dr. Patricia Hanlan
Detroit Country Day

Dr. Padu Karur
Associate Professor, Physics
Wayne State University

Dr. Daniel Kashian
Assistant Professor, Biological Sciences
Wayne State University

Mr. Kevin Rashid
Honors College
Wayne State University

Mr. Brandon Schroeder
Michigan Sea Grant Extension Educator
Michigan State University

Dr. Jennell White
Post-Doctoral Fellow
Pediatrics, Children's Hospital of Michigan
Wayne State University

Mr. Brandon Zeigler
Kalamazoo Area Mathematics & Science
Center



Welcome

from the JSHS Director
Dr. Sandra Yarema

Dear Students, Teachers, Parents and Colleagues,

It is my great privilege to welcome you to the 54th annual Junior Science and Humanities Symposium (JSHS) of Southeast Michigan. Once again we have a group of very talented young men and women from schools in southeast Michigan who will share their research with us. I would like to thank the teachers and mentors for the guidance they provided students throughout the research process and their parents for the support that such activities entail.

An event such as this one cannot be accomplished by one person alone and I would like to express my gratitude to those who help make this event possible every year: the members of the Advisory Board, judges, speakers and the administration of the College of Education at Wayne State University. A special thanks to Ms. Marion Tate for her help in the planning and running of the symposium.

I would like to take this opportunity to give you a short overview of the history of the JSHS, for those of you who might not be familiar with this wonderful program. The JSHS was established in 1958 by the U. S. Army Research Office. In 1995 the Office of Naval Research and in 1997 the U. S. Air Force joined the army in funding the symposium. However, the Academy of Applied Sciences administers the funds and organizes the National Symposium every year.

The primary aim of the JSHS is to promote research among high school students. Each year, more than 10,000 students and their teachers participate in forty-eight regional symposia held on university campuses across the country and in Alaska, Puerto Rico and the Department of Defense schools in Europe and the Pacific. Students presenting at the regional symposia have the opportunity to receive significant awards in the form of scholarships, payable to the university of their choice. The first, second and third student finalists at each of the regional symposium receive \$2000, \$1500, and \$1000 respectively, and all five finalists are invited to attend the National JSHS free of charge. The two finalists from each regional symposium also present their research at the National JSHS where they have the opportunity to receive additional awards. The three finalists in each of the categories at the National JSHS receive \$12,000.00, \$8,000.00 and \$4,000.00 respectively in scholarships. For additional information about the JSHS please visit: <http://coe.wayne.edu/ted/science/jshs/>

Thank you for participating in this year's symposium. I hope your experience is a memorable one.

Sandra Yarema, Director JSH

Welcome from the Assistant Dean



Dr. Kathryn Roberts

**Interim Assistant Dean of Teacher Education,
Associate Professor
College of Education
Wayne State University**

Dr. Kathryn Roberts has been with the Wayne State University College of Education since 2010, and is currently serving as the Interim Assistant Dean of Education. She is also an associate professor of Reading, Language, and Literature, and teaches classes at all degree levels on literacy teaching and learning.

Dr. Roberts primary research interest is reading comprehension, particularly in the content areas and as it relates to the integration of verbal and visual systems. In addition, she researches family literacy engagement and the use of graphic novels in elementary classrooms. Her publications on these topics can be found in journals such as *The Reading Teacher*, *Literacy Research and Instruction*, *Social Studies Research and Practice*, *Reading Psychology*, and *The Journal of Visual Literacy*.

Dr. Roberts will provide the welcome remarks at the opening session.

Research at Wayne State University



Kevin Rashid
Irvin D. Reid Honors College
Academic Services Officer IV

Kevin Rashid coordinates the Wayne State University Honors College's first-year curriculum and manages Research@Honors and the Detroit Fellows Tutoring Project--a large-scale, long-term service-learning effort to support basic literacy in the Detroit Public Schools. He is also a poet and facilitates creative writing workshops in nontraditional places. Kevin knows Wayne State "from the grounds-up," having worked for many years as a full-time university groundskeeper while earning his master's in English and teaching composition, creative writing and American Studies



Alaa K. Al-Makhzoomy
Irvin D. Reid Honors College
Instructional Technology Designer

Alaa Al-Makhzoomy, 37, works as an Instructional Tech Designer at the Irvin D. Reid Honors College at Wayne State University. He received a second Master's degree in Learning Design and Technology from Wayne State University in Winter 2017. He received his first Master's in Computer and Information Science from Cleveland State University in 2010. He has been teaching many disciplinary subfields of Computer Science and Information Systems since then at various institutes in Jordan and the U.S. He is a Ph.D. candidate in the Learning Design and Technology program at Wayne State and expected to defend his dissertation between May and August 2018. His research is focused on investigating the effects of Game-Development Based Learning on students learning computer programming in high-level languages, such as C++ and Java.

Where is She Now?



Ashi Arora
Past JSHS Finalist

Ashi Arora is a 2015 JSHS finalist, who is currently a junior at Wayne State University in the MedStart BS/MD program, earning a Bachelors in Science in Public Health and in Biological Sciences, and a certification in Entrepreneurship and Innovation.

Ashi has been doing research with Dr. Robert Akins in the Department of Microbiology, Immunology, and Biochemistry at the WSU School of Medicine since 2012, studying antifungal drug resistance and exosome-mediated adaptive stress responses in *Candida albicans*. She has presented her research at Wayne State's Undergraduate Research Conference, at the National Conference on Undergraduate Research, at the undergraduate research conference at the University of Maryland, Baltimore County, and will be presenting in the upcoming New England Science Symposium at Harvard Medical School.

In addition to pursuing her passion for her research, she has immersed herself in the public health field. She is a menstrual health activist, and recently received funding through Optimize Wayne's Social Innovation Challenge to create a chapter of PERIOD. at Wayne State and to initiate research to understand homeless women's experiences with menstruation and their access to water and health resources. Ashi's goal is to break down the social stigma surrounding menstruation and to provide menstruators in need with the resources they need through service, advocacy, and education.

Finally, Ashi serves as the American Medical Student Association's Gender and Sexuality Chair in which she is working with a team to create materials and programming relevant to deepening future-physicians' knowledge regarding the health of women and the LGBTQ+ community and advocating for their rights.



Stephanie L. Brock, Ph.D.
Professor,
Department of Chemistry, Wayne
State University

Stephanie Brock grew up in the Pacific Northwest, where she attended the University of Washington as an undergraduate (B.S. Chemistry, 1990). It was there that she first got a taste of original research, working in the laboratory of Prof. James Mayer. She enjoyed the work so much, she decided to pursue a Ph.D. degree, which she did at the University of California at Davis. There she moved from looking at how to manipulate molecules to the study of extended solids, under the direction of Prof. Susan Kauzlarich. She graduated in 1995 and then moved east to the University of Connecticut to do postdoctoral training under Prof. Steve Suib. There, she developed expertise in nanomaterials synthesis.

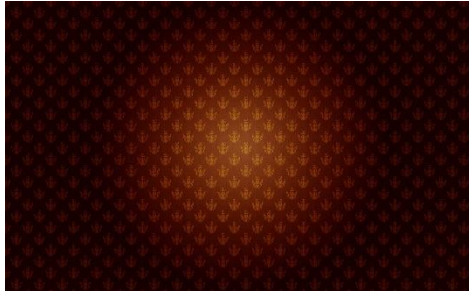
In the fall of 1999, Brock began a tenure-track position in the Department of Chemistry at Wayne State University and was promoted to Associate Professor with tenure in 2005 and Full Professor in 2009. She is a Fellow of the American Association for the Advancement of Science and of the American Chemical Society (ACS). She also serves as an Associate Editor for the ACS journal *Chemistry of Materials*.

Dr. Brock's research interests lie in the synthesis, properties and applications of nanomaterials to address challenges facing energy, the environment, and health.

In her presentation, Dr. Brock will explain what nanomaterials are, why we should care about them, and how we can use them to achieve a brighter technological future

Interlude with Music

Sposa String Quartet



Sposa String Quartet is made up of four current music students, majoring in music performance and composition at Wayne State University.

Sposa String Quartet is based in Detroit and plays weddings, parties, corporate events, and any other opportunity that can use musicians.

Sean O'Connell-Violin
Emily Paye-Violin
Gabriele Paese- Viola
Christian Sands- Cello

Campus Tour

Department of Chemistry



On Friday afternoon, students and guests will be able to visit the Department of Chemistry in the A. Paul Schaap Chemistry Building and Lecture Hall.

With a research pedigree dating to well before the 1944 establishment of the Ph.D. program by Neil E. Gordon, and a teaching mission embracing diversity and modern methodology, the department of Chemistry provides a supportive yet competitive atmosphere for faculty and students alike. We have over 150 graduate students and 30 postdoctoral fellow researchers in the Department. In the last three years nearly 60 Ph.Ds. and 150 Bachelor's degrees in Chemistry have been awarded

For more information visit: <http://chem.wayne.edu/>

Undergraduate Research at Wayne State University

<http://undergradresearch.wayne.edu/index.php>



The Office of Undergraduate Research (OUR) at Wayne State University provides funds to undergraduate students from disciplines across the university – hard sciences, social sciences, performing arts and humanities – to participate in undergraduate research. Undergraduate research puts theory into practice as students work on projects and are mentored by full-time faculty who are leaders in their field. The funds help cover students' research activities as well as travel expenses to present their research at local, regional and national conferences.

PROGRAM

Friday, MARCH 9th, 2018

8:00 a.m. - 9:30 a.m.

REGISTRATION & CONTINENTAL BREAKFAST

Lobby
McGregor Memorial Conference Center
Wayne State University

9:30 a.m. - 10:00 a.m.

OPENING SESSION

Room BC, First Level, McGregor Conference Center

PRESIDING:

Dr. Sandra Yarema Director - JSHS
Science Education Faculty
College of Education
Wayne State University

WELCOME/OVERVIEW OF WAYNE STATE UNIVERSITY:

Dr. Kathryn Roberts
Interim Assistant Dean, Teacher Education, College of Education

ORIENTATION:

Dr. Sandra Yarema
JSHS Director and Coordinator

10:00 a.m. - 11:30 a.m.

PRESENTATION OF STUDENT PAPERS

McGregor Conference Center

STUDENT PRESENTATIONS

SECTION I ROOM E, MCGREGOR: Medicine and Biomedical Health science

MODERATOR: **Dr. Russell Finley**, School of Medicine- Wayne State University

STUDENT PRESENTERS:

Astha Dalal

Effectiveness of Radiation via Tumor Interstitial Fluid Pressure

Alex Wu

Gene Selection and Risk Prediction on Breast Cancer with High-Dimensional Machine Learning Algorithms

Katharine Shao

The Effect of Mechanical Compression on Cancer Cell Proliferation

Shriya Reddy

Evaluation of the Contrast Enhancing Effects of Different Size Gold Nanoparticles Using Optical Coherence Tomography in the Early Diagnosis of Melanoma

JUDGES:

Dr. Russell Finley, School of Medicine- Wayne State University

Mita Asgari, Biology- Wayne State University

Lt. Colonel David Centeno Jr., Biology, TARDEC

Kimberly Derryberry, Psychology-TARDEC

Christopher Scott, Electrical/Automotive Engineer-TARDEC

SECTION II ROOM F, MCGREGOR: Chemistry & Molecular Cellular Sciences

MODERATOR: **Dr. Christy Chow**, Chemistry Department – Wayne State University

STUDENT PRESENTERS:

Maria Cheriyan

Demystifying Desiccants

Sridula Kallakuri

Effects of Heparin Conjugated Hyaluronic Acid on Sustained Release and Bioavailability of FGF-2: An In Vitro Study

Nikhil Mantana

The Evolutionary Change in the T58 Phosphorylation Site of Cytochrome c

Madeleine Yang

Efficient Incorporation of Matrix Protein M2 into Influenza Virus-like Particles (VLPs) to Improve Future Vaccine Production and Immunogenicity

JUDGES:

Dr. Christy Chow, Chemistry Department – Wayne State University

Thomson David, Electrical Engineer-TARDEC

Emmett Fox, Chemist- TARDEC

Ms. Katrina Harris, Mechanical Engineer, TARDEC

SECTION III ROOM I, McGREGOR: Math & Computer Sciences/Computer Engineering

MODERATOR: Mr. Greg Chappelle, STEM Coordinator/Scientist/Electrical Engineer-TARDEC

STUDENT PRESENTERS:

Sai Anantapuantula

Resiliency of the Shuffle-Cube in the face of link deletion

Ajay Arora

Computational Modeling of Spatio-temporal Calcium Signal Propagation in Three-dimensional Reconstructions of Liver Lobular Architecture

Xiomara Brammer-Gonzales

Bringing Xzy to Life Using Stop Motion Animation

JUDGES:

Mr. Greg Chappelle, STEM Coordinator/Scientist/Electrical Engineer-TARDEC

David Brown, Computer Scientist/Adjunct Professor, TARDEC

David Daniszewski, Computer Scientist/Adjunct Professor, TARDEC

Andrew Kosinski, Mechanical Engineer/Robotics-TARDEC

Dr. Ravi Thyagarajan, Mechanical Engineer, TARDEC

SECTION IV ROOM H, MCGREGOR: Life Sciences, Biomedical

MODERATOR: Dr. Anna Boegehold, Biology Department, Wayne State University

STUDENT PRESENTERS:

Saaz Malhotra

Engineering PD-LI specific diabodies for ImmunoPET imaging

Girish Muthumula

Evaluation of SMYD2–SAH–PARP1 protein complex: Uncovering essential peptides for chemotherapeutic applications

Akash Rathod

*Investigating the role of biotic factors in host responses to rhizobia in the system *Medicago truncatula**

Jason Zhang

Maspin-associated RUNX1, PLAU, and CDH3 as novel biomarkers of early lung adenocarcinoma

JUDGES:

Dr. Anna Boegehold, Biology, Wayne State University

Brandon Schroeder, Biology- Michigan Sea Grant Extension

Dr. Adrian Vasquez, Physiology- Wayne State University

Abby Wicks, Biology- Wayne State University

SECTION V ROOM J, McGREGOR: Physics, Engineering & Technology

MODERATOR: **Dr. David Cinabro**, Physics Department – Wayne State University

STUDENT PRESENTERS:

Runxuan Jiang

A Better Model for the Simulation of Rare Gas Adsorbates with Metal Organic Frameworks

Finsam Samson

Factors Influencing Muon Flux and Lifetime: An Experimental Analysis Using Cosmic Ray Detectors

Genevieve Yarema

The Speed of Muons from Different Angles

JUDGES:

Dr. David Cinabro, Physics Department, Wayne State University

Vijay George, Mechanical Engineer-TARDEC

Michael Shen, Mechanical Engineer, TARDEC

Shaheen Shidfar, Mechanical Engineer, TARDEC

11:45 p.m. – 1:30 p.m.

LUNCHEON BANQUET
Room LM – Lower Level, McGregor Conference Center

PRESIDING: **Dr. Sandra Yarema**
College of Education

WELCOME: **Dr. Kevin Rashid**

Honors College, Wayne State University

SPEAKERS: **Ashi Arora – *Where is She Now?***

TOPIC: Ashi Arora, finalist at the 2015 JSHS will talk about her research experiences during high school and how her participation in the JSHS impacted her college experiences and future research interests.

ANNOUNCEMENT OF FINAL STUDENT PAPERS

1:30-3:45 p.m. **CAMPUS TOUR: including A.Paul Shaap Chemistry Building and Lecture Hall**
(Wait in lobby area for directions)

3:45 p.m. - 5:00 p.m.

INTERLUDE – McGregor Conference Center Lobby

Student Poster Presentations

Music by WSU students from the *Sposa Strings Quartet*

5:00 p.m. - 6:30 p.m.

Final Judging

Room BC, Main level McGregor Conference Center

Moderator: **Dr. Karur Padmanabhan**, Physics Department- Wayne State University

Judges:

Dr. Karur Padmanabhan, Physics Department, Wayne State University

Dr. Roger Pique-Regi, Center Molecular Medicine/Genetics- WSU

Brandon Schroeder, Biology/ Environmental Science- MI Sea Grant

6:30 p.m.

BANQUET SESSION

Room LM – Lower Level, McGregor Conference Center

PRESIDING: **Dr. Sandra Yarema**
Director, JSHS

KEYNOTE SPEAKER: **Stephanie L. Brock, Ph.D.**,
Department of Chemistry, WSU

TOPIC: Nanomaterials: what they are, why we should care about them, and how we can use them to achieve a brighter technological future

AWARDS: **Presentation of Student Speaker Finalist Awards**
Dr. Sandra Yarema, Director

Student Participants – Evaluation Questionnaire Invitation

Dear JSBS participant,

Evaluators from Purdue University are conducting a study to learn about student experiences in Junior Science & Humanities Symposium (JSBS). We are asking you to fill out this survey because you participated in JSBS. Your feedback will be used to help us improve JSBS for students in the future and provide important information about your experiences. The sponsor of JSBS, the Army Educational Outreach Program (AEOP), is paying for this study. In 2017, more than 7000 students and 1000 adults will participate in JSBS and evaluators from Purdue University want to hear from you and your research mentor.

Here's how you can help:

- 1) Complete the JSBS Regional Survey using the hyperlink below. Your parent or guardian has already provided permission for us to ask you to participate in the survey. Now, it is up to you to decide whether you want to participate or not. The survey takes 25-30 minutes to complete on average.*

JSBS Regional Student Survey Link:

<https://www.cvent.com/d/6tq3pb>

JSBS Mentor Survey Link:

<https://www.cvent.com/d/ctq3py>

If you have any questions about these surveys or your participation in the evaluation study please contact the AEOP Evaluation team at Purdue University – Dr. Carla C. Johnson – carlacjohnson@purdue.edu or at (765) 494-0780.

Thank you so much for your participation in the evaluation of JSBS!

STUDENT RESEARCH PAPERS

Name	School	City
Sai Anantapantula	Northville High School	Northville
Ajay Arora	Novi High School	Novi
Xiomara Brammer-Gonzales	Home School	Farmington Hills
Maria Cherian	Detroit Country Day	Beverly Hills
Astha Dalal	Troy High School	Troy
Runxuan Jiang	Troy High School	Troy
Saaz Malhotra	Northville High School	Northville
Nikhil Mantena	Detroit Country Day	Beverly Hills
Girish Muthumula	Troy High School	Troy
Akash Rathod	Okemos High School	Okemos
Shriya Reddy	Northville High School	Northville
Finsam Samson	Troy High School	Troy
Katharine Shao	Detroit Country Day	Beverly Hills
Alex Wu	Cranbrook Schools	Bloomfield Hills
Madeleine Yang	Detroit Country Day	Beverly Hills
Genevieve Yarema	Grosse Pointe South High School	Grosse Pointe
Jason Zhang	Troy High School	Troy

STUDENT POSTER PARTICIPANTS

Name	School	City
Sai Anantapantula	Northville High School	Northville
Ajay Arora	Novi High School	Novi
Xiomara Brammer-Gonzales	Home School	Farmington Hills
Mark Chen	Cranbrook Schools	Bloomfield Hills
Maria Cherian	Detroit Country Day	Beverly Hills
Astha Dalal	Troy High School	Troy
Narenda Edara	Detroit Country Day	Beverly Hills
Enoch Hung	Detroit Country Day	Beverly Hills
Runxuan Jiang	Troy High School	Troy
Saaz Malhotra	Northville High School	Northville
Nikhil Mantena	Detroit Country Day	Beverly Hills
Girish Muthumula	Troy High School	Troy
Neil Nakkash	Detroit Country Day	Beverly Hills
Akash Rathod	Okemos High School	Okemos
Shriya Reddy	Northville High School	Northville
Finsam Samson	Troy High School	Troy
Katharine Shao	Detroit Country Day	Beverly Hills
Alex Wu	Cranbrook Schools	Bloomfield Hills
Madeleine Yang	Detroit Country Day	Beverly Hills
Genevieve Yarema	Grosse Pointe South High School	Grosse Pointe
Jason Zhang	Troy High School	Troy

STUDENT GUEST OBSERVERS

Loyola High School

Kenneth Beard
Jordan Copeland
Jeffrey Gary
Davis Greene
Kwesi Henry
Denauti Herman
Christian Kimble
Mark Mayberry
Timmy McDonald
Gabriel Watts

TEACHER/SUPERVISOR/ADMINISTRATIVE PARTICIPANTS

Name	School	City
Rebecca Brewer	Troy High School	Troy
David Chapman	Okemos High School	Okemos
James DiDo	Novi High School	Novi
Marc Fazio	Detroit Country Day School	Beverly Hills
Richard Fitzner	Detroit Country Day School	Beverly Hills
Dr. Sandra Gonzales	Wayne State Univesity	Detroit
Katharine Gross	Loyola High School	Detroit
Dr. Patricia Hanlan	Detroit Country Day School	Beverly Hills
Amber Holcomb	Washtenaw International High School	Washtenaw
Dr. Stephanie Kokoszka	Cranbrook Schools	Bloomfield Hills
Karin Nelson	Northville High School	Northville

Judges

Mita Asgari

Graduate Teaching Assistant
Biological Science
Wayne State University

Dr. Anna Boegehold

Biology Department
Wayne State University

Mr. David Brown

Computer Scientist/Adjunct Professor
U.S. Army TARDEC/DoD Personnel

Lt. Colonel David Centeno Jr.

Biology
U.S. Army TARDEC/DoD Personnel

Mr. Greg Chappelle

STEM Coordinator/Scientist/Electrical Engineer
U.S. Army TARDEC/DoD Personnel

Dr. Christine Chow

Chemistry Department
Wayne State University

Dr. David Cinabro

Physics Department
Wayne State University

Mr. David Daniszewski

Computer Scientist/Adjunct Professor
U.S. Army TARDEC/DoD Personnel

Thomson David

Electrical Engineer
U.S. Army TARDEC/DoD Personnel

Kimberly Derryberry

Psychology/Public Affairs
U.S. Army TARDEC/DoD Personnel

Dr. Russell Finley

School of Medicine
Wayne State University

Emmett Fox

Chemist
U.S. Army TARDEC/DoD Personnel

Mr. Vijay George

Mechanical Engineer
U.S. Army TARDEC/DoD Personnel

Ms. Katrina Harris

Mechanical Engineer
U.S. Army TARDEC/DoD Personnel

Dr. Christopher Kelly

Biomedical Physics
Wayne State University

Andrew Kosinski

Mechanical Engineering/Robotics
U.S. Army TARDEC

Dr. Karur Padmanabhan

Physics Department
Wayne State University

Dr. Roger Pique-Regi

Molecular Medicine-Genetics
Wayne State University

Brandon Schroeder

Biology/Environmental Science
Michigan Sea Grant Extension
Michigan State University

Christopher Scott

Electrical Engineer/Automotive Engineer
U.S. Army TARDEC/DoD Personnel

Mr. Michael Shen

Mechanical Engineer
U.S. Army TARDEC/DoD Personnel

Shaheen Shidfar

Mechanical Engineer
U.S. Army TARDEC/DoD Personnel

Dr. Ravi Thyagarajan Ph.D.

Mechanical Engineer
U.S. Army TARDEC/DoD Personnel

Dr. Adrian Vasquez

Physiology, Molecular Biology, Ecology
Wayne State University

Abby Wicks

Graduate Research Assistant
Biology
Wayne State University

SPECIAL ARRANGEMENTS AND ACKNOWLEDGMENTS

Alaa K. Al-Makhzoomy
Irvin D. Reid Honors College
Wayne State University

Ms. Doris E. Cousens, Director
National Junior Science & Humanities Symposium
Academy of Applied Science

Mr. Greg Chappelle
Tank-Automotive Research, Development, and Engineering Center
(TARDEC)

Dr. Stephanie L. Brock
Department of Chemistry
Wayne State University

Major Marlon Bride
Acquisition Officer, U.S. Army
TARDEC

Kevin Rashid
Irvin D. Reid Honors College
Wayne State University

Dr. Kathryn Roberts
Interim Associate Dean of Teacher Education
College of Education
Wayne State University

Mr. Brandon Schroeder
Michigan Sea Grant Extension
Michigan State University

Ms. Marion Tate
College of Education
Wayne State University

Wayne State University

*Create and Advance Knowledge, Prepare a Diverse Student Body to Thrive, and Positively
Impact Local and Global Communities*