



Academy of Applied Science



**Forty-Fourth Annual**

**Southeastern Michigan**

**Junior Science and  
Humanities  
Symposium**

**Program**  
**2008**

**WAYNE STATE  
UNIVERSITY**

**McGregor Memorial Conference Center  
Detroit, Michigan**

**March 6 and 7, 2008**

**Forty-Fourth Annual**  
**SOUTHEASTERN MICHIGAN**  
**JUNIOR SCIENCE AND HUMANITIES**  
**SYMPOSIUM**

Thursday and Friday, March 6th and 7th, 2008

*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

Association United States Army  
Detroit Chapter

National Defense Industrial Preparedness Association  
Michigan Chapter

Engineering Society of Detroit

**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 enlarge 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.*

## ADMINISTRATION OF JSHS

**Dr. Maria M. Ferreira**

Associate Professor of Science Education, College of Education, Wayne State University  
Director and Coordinator of JSHS

## JSHS ADVISORY BOARD

**Mr. Jeff Conn**

Senior Lecturer  
College of Science—Physics  
Wayne State University

**Mr. Brian Derowski**

Teacher  
Sanilac County Science and Math Center (SCSMC)

**Dr. Herbert Dobbs**

Retired Technical Director of U.S. Army  
Tank-Automotive Command

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Associate Professor  
Mathematics Education  
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Associate Professor  
Center for Molecular Medicine & Genetics  
Wayne State University

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Associate Department Chair  
Mathematics/Science  
Wayne State University

**Dr. Michele Grimm**

Associate Dean for Academic Affairs  
Engineering  
Wayne State University

**Ms. Margaret Hoard**

Secretary JSHS  
Wayne State University

**Dr. Rubye Holloway**

Science Administrator  
Detroit Public Schools

**Dr. Steven Imer**

Associate Dean for Research, College of Education  
Wayne State University

**Dr. Padu Karur**

Associate Professor  
Experimental Condensed Matter Physics  
Wayne State University

**Dr. Daniel Kashian**

Assistant Professor, Biological Sciences  
Wayne State University

**Dr. Gerald Oglan**

Assistant Dean, Teacher Education Division  
College of Education  
Wayne State University

**Dr. Claude A. Pruneau**

Associate Professor  
Physics  
Wayne State University

**Mr. Kevin Rashid**

Honors Curriculum Coordinator  
Wayne State University

**Dr. David Rueda**

Assistant Professor- Chemistry  
Wayne State University

**Dr. Paula Wood**

Dean, College of Education  
Wayne State University

## Guest Speaker

Shadan Ardalan, Jet Propulsion Laboratory

### *Cassini-Huygens: Historic Mission at Saturn*

The Cassini-Huygens mission has nearly completed its four-year prime mission orbiting around Saturn. The spacecraft has been returning stunning images of the rings and the many moons of Saturn in addition to interesting information about the planet, its ring structure, the massive moon Titan and the other eight major satellites. Thanks to the technology and precision of Cassini's twelve scientific instruments and Europe's Huygens probe, major discoveries have been made, including the lakes on Titan, Enceladus' geysers and the intriguing surface of Iapetus. Science textbooks are being rewritten because of these discoveries, and will continue to do so for decades to come.



Shadan Ardalan is a member of the Navigation Team for the Cassini-Huygens mission to Saturn. He received his Bachelor degree from Purdue University in Astronautical Engineering in 1991, and subsequently received his Masters in Astronautical Engineering from the University of Southern California in 1995.

Professionally, Shadan started his career in 1987 as a Co-Op Student working for The Aerospace Corporation on the Air Force Space Program. Shadan joined NASA's Jet Propulsion Laboratory in 1995 and has been blessed to work as an altitude control engineer and a navigator on other historic missions, such as the Galileo mission orbiting Jupiter, Mars Odyssey (in support of the Mars rovers), and Deep Impact.

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## **Dr. Grace M. Bochenek**

**Director  
U.S. Army Tank-Automotive Research,  
Development and Engineering Center  
Warren, Michigan**

Dr. Grace M. Bochenek is Director of the U.S. Army Research, Development and Engineering Command's Tank Automotive Research, Development and Engineering Center (TARDEC) in Warren, Michigan. TARDEC is the military's premier laboratory for advanced technology for ground vehicle systems. She brings more than 20 years of scientific, technical and managerial experience to this preeminent Army institution of superior engineering and research excellence.

Prior to becoming TARDEC's Director, Dr. Bochenek served as Deputy Program Executive Officer (DPEO) for Combat Support and Combat Service Support. As DPEO, she led over 400 civilian personnel, 3 Project Management Offices, 18 managers, and 270 ACAT III programs in five geographically distributed sites supporting the Army's tactical wheeled vehicle fleet and force projection commodities. She is a recognized expert in 3-D visualization, immersive virtual technology and real-time simulation and integration design processes.

Dr. Bochenek is the U.S. voting member of the North Atlantic Treaty Organization (NATO) Applied Vehicle Technology Panel. She serves on Michigan Technological University's College of Engineering Industrial Advisory Board and is an Adjunct Professor at Wayne State University. Dr. Bochenek has a bachelor's degree in electrical engineering from Wayne State University, a master's degree in engineering from the University of Michigan, and a Ph.D. from the University of Central Florida.

For more information about TARDEC, go to <http://tardec.army.mil>.

## **Dr. Paul D. Rogers**

**Executive Director for Research  
Tank-Automotive Research,  
Development and Engineering Center  
Warren, Michigan**



Dr. Paul Rogers is currently serving in the dual-hat position as the Executive Director for Research and Technical Director, U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC). TARDEC-Research is the lead organization for Army research and development in Ground Vehicle Mobility, Survivability, and Intelligent Systems. As Executive Director, he manages the technology base programs and leads a 300 person workforce through four technical business area associate directors. He is also responsible for executive oversight for the Joint Center for Unmanned Ground Vehicles. As Technical Director, Dr. Rogers serves as the key executive responsible for science and technology strategic planning, program selection, funding allocation, execution and transition to acquisition programs. Dr. Rogers leads programs to align ground-based systems science and technology research objectives to meet the Army's future war fighting and logistic needs.

Dr. Rogers holds a Ph.D. in Mechanical Engineering-Engineering Mechanics from Michigan Technological University, a Masters of Science in Engineering – Mechanical Engineering from the University of Michigan – Dearborn, and a Bachelors of Science in Mechanical Engineering from Michigan Technological University.





## Tiago Jesus

Tiago is a 9<sup>th</sup> grader at the International Academy in Bloomfield Hills where he plays in the Symphonic and Jazz Bands. Last year he played in the Detroit International Jazz Festival with the Boulan Park Middle School Jazz Band and attended the Blue Lake Fine Arts Camp (Jazz Band). Before moving to the United States with his family two years ago, Tiago played for two years in a Portuguese classical city band.

**Tiago has received a number of awards including:**

- 1<sup>st</sup> division rating in Solo & Ensemble 2008
- 1<sup>st</sup> division rating on the Jazz State Festival 2007
- 1<sup>st</sup> division rating in Solo & Ensemble 2007

## Joao Jesus

Joao (John) is an 8<sup>th</sup> grader at the Boulan Park Middle School where he has been playing in the advanced band and jazz band for the past three years. Last summer he attended the Blue Lake Fine Arts Camp (Band) and this year hopes to play in the Detroit International Jazz Festival. Before moving to the United States with his family, he played for two years in a Portuguese classical city band.

**Joao has received a number of awards including:**

- 1<sup>st</sup> division rating in Solo & Ensemble 2008
- 1<sup>st</sup> division rating in Solo & Ensemble 2007
- Student Camp of the year - Blue Lake Fine Arts Camp 2007

# Campus Tour



## **TECHTOWN - A Community of Entrepreneurs on the Wayne State Campus**

TechTown is a community of entrepreneurs, investors, mentors, service providers and corporate partners creating an internationally recognized entrepreneurial village in the city of Detroit. Located in the heart of the Woodward Technology Corridor, TechTown has developed a track record of propelling entrepreneurs to great success.

**The following companies will be part of the tour:**

- **Asterand**
- **EXT Life Sciences**
- **Visca**
- **Academic Computing Environment**
- **SenSound**
- **WSU's PRB - Perinatology Research Branch**

For more information on TechTown visit: <http://www.techtownwsu.org/>

## PROGRAM

THURSDAY AND FRIDAY, MARCH 6 AND 7, 2008

THURSDAY, MARCH 6, 2008

*2:30 p.m.- 3:30 p.m.*

### REGISTRATION

Lobby  
McGregor Memorial Conference Center  
Wayne State University

*M. L. King, Jr. High Students, Detroit*

**Dr. Rubye Holloway**, Sponsor  
Detroit Public Schools

*3:30 p.m. - 4:00 p.m.*

### OPENING SESSION

Room B/C, McGregor

*PRESIDING:*

**Dr. Maria Ferreira**, Director, JSHS  
Associate Professor of Science Education  
College of Education  
Wayne State University

*WELCOME/OVERVIEW OF WAYNE STATE UNIVERSITY:*

**Dr. Gerald Oglan**, Assistant Dean Teacher Education Division  
College of Education, Wayne State University

*WELCOME*

**Dr. Paul Rogers**, Executive Director of Research  
U.S. Army RDECOM, TARDEC

*ORIENTATION:*

**Dr. Maria Ferreira**  
JSHS Director and Coordinator

*4:00 p.m.- 6:00 p.m.*

### PRESENTATION OF STUDENT PAPERS

McGregor Conference Center

## PRESENTATIONS

### SECTION I ROOM E, MCGREGOR

*MODERATOR:*        **Dr. Karen Benigno**, Biology Department - Wayne State University

*STUDENT PRESENTERS:*

**Yifan Feng**

*The Notch Pathway Mediates Expansion of a Porgenitor Pool and Neuronal Differentiation after Stroke*

**Helen Gay**

*Incandescent Light Bulbs: The Correlation Between Heat and Light Output*

**Brandie Kreiner**

*Unhealthy Levels of Iron in Breakfast Cereal*

**Riva Shah**

*An Epidemiological Study of Depression-Awareness Amongst High School Students and Teachers*

**Arthi Sridar**

*Inhibition of Human Polymorphic Drug Metabolizing Cytochrome P40 2B6 K262R and Adverse Drug Interactions*

*JUDGES:*

**Dr. Peter Andreana**, Chemistry Department - Wayne State University

**Ms. Katrina Prantzos**, Electrical Engineer – TARDEC

## **SECTION II ROOM F, McGREGOR**

**MODERATOR:**       **Dr. Scott Payson**, Physics Department - Wayne State University

### **STUDENT PRESENTERS:**

**Omar Abudayyeh**

*Innervation of a Target Muscle Regulated by Postsynaptic Factors*

**Joshua Cambridge**

*The Effects of Varying Lengths of Heat Shock on the Efficiency of Transformation in E. coli*

**Joshua Mathews**

*Investigating the Plausibility of Wind Turbines on Motor Vehicles*

**Justin Walls**

*The Effects of Sludge on Plants*

**Jia Jia Zhang**

*Headache Remedies around the World: Does East Meet West in Pharmaceuticals?*

### **JUDGES:**

**Dr. Janice Rueda**, Nutrition and Food Science - Wayne State University

**Mr. Sid Shidfar**, Mechanical Engineer – TARDEC

## SECTION III ROOM G, MCGREGOR

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

### *STUDENT PRESENTERS:*

**Katherine Fang**

*Leptin's Signaling Pathway that Controls Body Weight: The 701 Tyrosine on TrkB is Critical in the Signal Transduction of BDNF*

**Jessica Gwisdala**

*A Comparison of Weight Gains in Flemish Giant Rabbits (*Oryctolagus cuniculus flemish*)*

**Nicholas Jex**

*Paintballs: A Comparison of Brand Effectiveness*

**Rahul Pandey**

*A Three Dimensional Lens with Alternative Unit Cell Design for Negative Refractive Index*

**Nakisha Rutledge**

*Development of Chitosan Fiber Scaffolds for Culture of Valvular Interstitial Cells*

### *JUDGES:*

**Dr. Vladimir Chernyak**, Chemistry Department – Wayne State University

**Dr. Paul Rogers**, Director of Research - TARDEC

**Dr. Ann Sodja**, Biology Department – Wayne State University

## **SECTION IV ROOM H, McGREGOR**

*MODERATOR:* **Dr. Rubye Holloway**, Detroit Public Schools

### *STUDENT PRESENTERS:*

**Hari Arul**

*Synthesis and Replenishment of Silver Nanoparticle-Enabled Polymeric Membranes for Biofouling Mitigation*

**Stephanie Fraley**

*Computer Games Effect on Middle School Students*

**Jessica LaDuke**

*Effects of Light Color on Plant Growth*

**Kunal Mehta**

*Relationship between Genetic Polymorphism in the C1qA Gene and total C1q Protein Production*

**Jahanavi Ramakrishna**

*The Effect of Attentional Load on Inattentional Blindness*

### *JUDGES:*

**Mr. Robert Udvare**, Mechanical Engineer - TARDEC

**Dr. Dan Kashian**, Biology Department – Wayne State University

**SECTION V ROOM I, McGREGOR**

**MODERATOR: Dr. Stephanie Pandolfi**, Biology Department – Wayne State University

**STUDENT PRESENTERS:**

**Hannah Cheriyan**

*Tea: Nutrition or Pollution? The Effect of Tea on Brine Shrimp*

**Brock Dean**

*E. coli Testing*

**Esha Kumar**

*Epigenetic Toxicity of Polycyclic Aromatic Hydrocarbons*

**Ana Lyons**

*The Effects of Imidacloprid Soil-Drenching on Terrestrial Tardigrada of the Great Smoky Mountains National Park, TN: A Microfaunal Response to A. tsugae Insecticide Control*

**Jacob Soule**

*Lightning Electrolysis*

**JUDGES:**

**Mr. Dion Gnanakkan**, Doctoral Student – Wayne State University

**Mr. Cle Harris**, Mechanical Engineer - TARDEC



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

**INTERLUDE**  
**Room B/C McGregor**

*Student Poster Presentations*  
*Music by Tiago and Joao Jesus*

**6:30 p.m.- 8:30 p.m.**

**BANQUET SESSION**  
Room LM – Lower Level, McGregor Conference Center

**PRESIDING:**           **Dr. Maria Ferreira**  
Director, JSHS

**WELCOME:**           **Dr. Grace M. Bochenek, Director**  
U.S. Army Tank Automotive Research, Development and  
Engineering Center (TARDEC)

**SPEAKER:**           **Shadan Ardalan, Jet Propulsion Laboratory**

**TOPIC:**               ***Cassini-Huygens: Historic Mission at Saturn***

**ANNOUNCEMENT OF FRIDAY'S STUDENT PAPERS:**

**Dr. Maria Ferreira**  
Director, JSHS

**FRIDAY, MARCH 7, 2008**

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

**CONTINENTAL BREAKFAST**

Community Arts Building—Outer Gallery

**9:30-11:00 a.m.**

**CAMPUS TOUR: *Tech Town***

*(wait in breakfast area for tour guide)*

**9:00 a.m. - 11:45 a.m.**

**Final Judging**

McGregor Conference Center, Room I

*Moderator:*

**Dr. Thomas Edwards**, Mathematics Education – Wayne State University

*Judges:*

**Dr. Matt Allen**, Chemistry Department - Wayne State University

**Dr. Karen Myhr**, Biology Department – Wayne State University

**Dr. Claude Pruneau**, Physics Department – Wayne State University

**12:00 p.m.-1:30 p.m.**

**LUNCHEON BANQUET**

Room LM – Lower Level, McGregor Conference Center

*PRESIDING:*

**Dr. Maria Ferreira**

College of Education

*WELCOME:*

**Dr. Michele Grimm**

Associate Dean, College of Engineering

*SPEAKER:*

**Kevin Rashid**, Honors Program – Wayne State University

*TOPIC:*

***Undergraduate Research Opportunities at Wayne State University***

*STUDENT PRESENTERS:*

- **Adrienne Stefanski:** *The Effect of Prenatal Toluene Exposure on Skeletal Abnormality*  
Faculty mentor: **Scott Bowen**
- **Ellizar Abalos:** *Ethiopian Music and Culture: Rich Musical Culture Studied in a Practical Manner*  
Faculty mentors: **Terese Volk** and **Lawrence Lemke**

*1:30 p.m. - 2:15 p.m.*

**CLOSING SESSION**

*PRESIDING:*

**Dr. Maria Ferreira**  
Director, JSHS

*AWARDS:*

**Presentation of Student Speaker Awards**  
Dr. Maria Ferreira, Director

*PRESENTATION FROM STUDENT FINALIST*

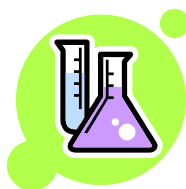
*EVALUATION OF PROGRAM:*

**Participants please complete evaluation forms**

## **REGISTRATION COMMITTEE**

**Martin Luther King, Jr. High School**

**LaTonya Berry  
Brent Pentecost  
Britney Sharp  
Cierra Traylor  
Shaniquea Webb  
Eric Yeager**



## STUDENT RESEARCH PAPERS

Name	School	City
Omar Abudayyeh	Kalamazoo Area Math & Science Center	Kalamazoo
Hari Arul	Detroit Country Day	West Bloomfield
Joshua Cambridge	Sandusky High School	Sandusky
Hannah Cheriyan	Detroit Country Day	Farmington Hills
Brock Dean	Marlette High School/	Kinston
Katherine Fang	Pioneer High School	Ann Arbor
Yifan Feng	Athens High School	Troy
Stephanie Fraley	Sandusky High School	Sandusky
Helen Gay	Croswell-Lexington High School	Lexington
Jessica Gwisdala	Sandusky High School	Sandusky
Nicholas Jex	Croswell-Lexington High School	Jeddo
Brandie Kreiner	Brown City High School	Brown City
Esha Kumar	Okemos High School	Okemos
Jessica LaDuke	Sandusky High School	Sandusky
Ana Lyons	Morley Stanwood High School	Morley
Joshua Mathews	Croswell-Lexington High School	Jeddo
Kunal Mehta	Detroit Country Day	Novi
Rahul Pandey	Stoney Creek High School	Rochester Hills
Jahanavi Ramakrishna	Detroit County Day	Troy
Nakisha Rutledge	Renaissance High School	Detroit
Riva Shah	Kalamazoo Area Math & Science Center	Portage
Jacob Soule	Brown City High School	Brown City
Arthi Sridar	Novi High School	Novi
Justin Walls	Croswell-Lexington High School	Roseville
Jia Jia Zhang	Battle Creek Area Math/Science Center	Battle Creek

## STUDENT PARTICIPANTS

Name	School	City
Omar Abudayyeh	Kalamazoo Area Math & Science Center	Kalamazoo
Hari Arul	Detroit Country Day	West Bloomfield
LaTonya Berry	Martin Luther King, Jr. Senior High School	Detroit
Joshua Cambridge	Sandusky High School	Sandusky
Hannah Cheriyan	Detroit Country Day	Farmington Hills
Kimberly Chew	Roseville High School	Roseville
Ashley Childers	Roseville High School	Roseville
Brock Dean	Marlette High School/	Kinston
Katherine Fang	Pioneer High School	Ann Arbor
Yifan Feng	Athens High School	Troy
Stephanie Fraley	Sandusky High School	Sandusky
Helen Gay	Croswell-Lexington High School	Lexington
Jessica Gwisdala	Sandusky High School	Sandusky
Asia Hill	Martin Luther King, Jr. Senior High School	Detroit
Amanda Hollingsworth	Roseville High School	Roseville
Nicholas Jex	Croswell-Lexington High School	Jeddo
Jomy Jose	Roseville High School	Roseville
Bianca Kincannon	Cass Technical High School	Detroit
Brandie Kreiner	Brown City High School	Brown City
Esha Kumar	Okemos High School	Okemos
Jessica LaDuke	Sandusky High School	Sandusky
Ana Lyons	Morley Stanwood High School	Morley
Joshua Mathews	Croswell-Lexington High School	Jeddo
Hillary McCauley	Roseville High School	Clinton Township
Kunal Mehta	Detroit Country Day	Novi
Rahul Pandey	Stoney Creek High School	Rochester Hills
Breana Parks	Martin Luther King, Jr. Senior High School	Detroit
Brent Pentecost	Martin Luther King, Jr. Senior High School	Detroit
Antonio Pentecost	Martin Luther King, Jr. Senior High School	Detroit
Jahanavi Ramakrishna	Detroit County Day	Troy
Nakisha Rutledge	Renaissance High School	Detroit
Riva Shah	Kalamazoo Area Math & Science Center	Portage
Britney Sharp	Martin Luther King, Jr. Senior High School	Detroit
Jacob Soule	Brown City High School	Brown City
Arthi Sridar	Novi High School	Novi
April Surinck	Roseville High School	Roseville
Jennifer Thomas	Martin Luther King, Jr. Senior High School	Detroit
Azzia Thompson	Martin Luther King, Jr. Senior High School	Detroit
Cierra Traylor	Martin Luther King, Jr. Senior High School	Detroit
Justin Walls	Croswell-Lexington High School	Roseville
Shaniquea Webb	Martin Luther King, Jr. Senior High School	Detroit
Huli Xiong	Roseville High School	Roseville
Eric Yeager	Martin Luther King, Jr. Senior High School	Detroit
Lauren Yeary	Martin Luther King, Jr. Senior High School	Detroit
Jia Jia Zhang	Battle Creek Area Math/Science Center	Battle Creek

**TEACHER/SUPERVISOR/ADMINISTRATIVE  
PARTICIPANTS**

<b>Name</b>	<b>School</b>	<b>City</b>
Kathleen Ader	Novi High School	Novi
Cynthia Bridges	Renaissance High School	Detroit
Sandra Dejoie	Martin Luther King, Jr. Senior High School	Detroit
Brian Derowski	Marlette High School/	Peck
Walt Erhardt	Battle Creek Area Math/Science Center	Battle Creek
John Goudie	Kalamazoo Area Math & Science Center	Kalamazoo
Ruby Holloway	Martin Luther King, Jr. Senior High School	Detroit
Gene Menton	Detroit Country Day	Beverly Hills
Colleen Palmer	Okemos High School	Okemos
Pam Teimorzadeh	Athens High School	Troy
David Thomson	Stoney Creek High School	Rochester Hills
Eric Thuma	Stoney Creek High School	Rochester Hills
Laurie Tomczyk	Morley Stanwood High School	Morley
Gillian von Seeger	Detroit Country Day	Beverly Hills
Susan Washabaugh	Pioneer High School	Ann Arbor
Scott Wheeler	Roseville High School	Roseville

## Judges

**Dr. Matt Allen**

Chemistry Department  
Wayne State University

**Dr. Karen Beningo**

Biology Department  
Wayne State University

**Dr. David Cinabro**

Physics Department  
Wayne State University

**Mr. Dion Gnanakkan**

Doctoral Student  
Wayne State University

**Dr. Rubye Holloway**

Martin Luther King H. S  
Detroit Public Schools

**Dr. Karen Myhr**

Biology Department  
Wayne State University

**Dr. Scott Payson**

Physics Department  
Wayne State University

**Dr. Claude Pruneau**

Physics Department  
Wayne State University

**Dr. Janice Rueda**

Nutrition and Food Science  
Wayne State University

**Dr. Ann Sodja**

Biology Department  
Wayne State University

**Dr. Peter Andreana**

Chemistry Department  
Wayne State University

**Dr. Vladimir Chernyak**

Chemistry Department  
Wayne State University

**Dr. Thomas Edwards**

Mathematics Education  
Wayne State University

**Mr. Cle Harris**

Mechanical Engineering  
TARDEC

**Dr. Dan Kashian**

Biology Department  
Wayne State University

**Dr. Stephanie Pandolfi**

Biology Department  
Wayne State University

**Ms. Katrina Prantzalos**

Electrical Engineering  
TARDEC

**Dr. Paul Rogers**, Director of Research  
TARDEC

**Mr. Sid Shidfar**

Mechanical Engineering  
TARDEC

**Mr. Robert Udvare**

Mechanical Engineering  
TARDEC





**Poster Session Sponsored by Wayne State  
University College of Engineering**

**A special thanks to Dr. Michele Grimm**, Associate  
Dean for Academic Affairs in the College of Engineering for  
facilitating this session

<http://www.eng.wayne.edu/>

**SPECIAL ARRANGEMENTS AND ACKNOWLEDGMENTS**

**Dr. Grace M. Bochenek, Director**

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

**Doris E. Cousens, Director**

National Junior Science & Humanities Symposium  
Academy of Applied Science

**Dr. & Mrs. Herbert Dobbs**

Association U.S. Army, Detroit Chapter

**Dr. Thomas Edwards**

Associate Professor of Mathematics Education  
Wayne State University

**Dr. Michele Grimm**

Associate Dean for Academic Affairs, Engineering  
Wayne State University

**Dr. Rubye Holloway**

Assistant Principal, Martin. L. King, Jr. Senior High School  
Detroit Public Schools

**Ms. Margaret Hoard**

TED Secretary, College of Education  
Wayne State University

**Mrs. Sandra Jenkins**

TED Division Secretary, College of Education  
Wayne State University

**Dr. Padu Karur**

Physics Department  
Wayne State University

**Ms. Tina Lyles**

McGregor Conference Center

**Ms. Joyce Martin**

Administrative Assistant, College of Education  
Wayne State University

**Mr. Kevin Rashid**

Honors Program  
Wayne State University

**Dr. Paul Rogers, Director of Research**

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

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**Wayne State University**  
*World-Class Education in the Real World*