Project SEED
Program Summary

Hands-On Research for High School Students
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Project SEED Mission Statement

“To assure that students from economically disadvantaged backgrounds have opportunities to experience the challenges and rewards of chemically-related sciences.”
Project SEED, a program of the American Chemical Society (ACS), helps economically disadvantaged high school students realize their potential and pursue a college education. Since 1968, the program has placed nearly 10,000 students in academic, industrial, and governmental laboratories for 8 to 10 weeks during the summer. For their work students receive a fellowship and the chance to experience college life and increase their self-confidence. This summer, students were mentored by 460 volunteer scientists and coordinators at 126 institutions in 39 states, the District of Columbia, and Puerto Rico. Students received individualized attention as each mentor supervises only one or two students.

This was another successful year for Project SEED, with a total of 423 students participating in the program, 316 of whom were Summer I students and 107 of whom were Summer II students. To assess the success of the program, the students were asked to respond to a questionnaire. Of the 423 students in the program, 406 responded. The results of the survey indicate that Project SEED does serve its target population: 63% of the respondents come from low-income families with incomes of $25,000 or less. Eighty-one percent of the students validate that Project SEED achieves its goal of stimulating knowledge and interest in science; 97% of the respondents indicate that Project SEED helped them to develop new skills and abilities, 91% note that Project SEED was successful in improving their self-confidence; 64% report that their overall experience helped them decide to pursue a career in science; and 78% of the students expect to complete a college degree in STEM fields. Respondents rated the Project SEED program highly. Students recommended the Project SEED experience to all students.

Twenty Project SEED students representing the Central New York, Indiana, New York, Northeastern, North Jersey, and Trenton Local Sections presented their Project SEED research projects at the Sci-Mix poster session at the ACS fall meeting in Boston (See page 33.). The ACS Project SEED Endowment, industries, foundations, academic institutions, ACS Local Sections, and ACS friends and members supported total student fellowships of $1,109,500. (See pages 36-39.) ACS provided student fellowships and paid all administrative costs.

The Project SEED program awards non-renewable college scholarships to Project SEED students entering their freshman year in college. In 2015, 28 students pursuing careers in a chemical science received this award (See pages 20-24). The scholarships of up to $5,000 were funded through the continuing generosity of Alfred and Isabel Bader, the Ashland Inc., the Bayer Foundation, the Russel J. Fosbinder, and the Glenn and Barbara Ullyot Endowments. In addition, three Project SEED college scholars received the CIBA Specialty Chemicals scholarships for three renewable years beginning in their sophomore year.

On behalf of the ACS, the staff, the Project SEED Committee, and the students, thank you to our volunteer mentors and coordinators, their supporting institutions, our friends and members, and financial supporters. We are grateful for your support and generosity. The success of the students in this program is a testimony to the effective and inspirational time and effort given by their mentors.
# 2015 Project SEED Summer I & II Programs

## Institutions/Coordinators/Mentors

### ALASKA

**University of Alaska-Fairbanks, William Howard**  
William Howard

### ALABAMA

**Jacksonville State University, Nixon Mwebi**  
Nixon Mwebi

### CALIFORNIA

**California State University, Los Angeles, Frank Gomez**  
Frank Gomez  
Robert Vellanoweth  
Cecilia Zurita-Lopez

**California State University, San Bernardino, Dennis Pederson**  
Jingsong Zhang  
University of California, Riverside

**Chevron, Elaine Yamaguchi**  
Florence Wu, FeiFei Han  
Aemtek, Inc.

**Chevron Energy Technology Company**  
Michael Cheng  
Mounita Dutta  
Tao Wei  
Toni Miao

**Chevron Oronite Company LLC**  
Ken Nelson, Jonathan Moore  
Kaustav Chaudhuri  
Roland Ma

**Chevron Products Company**  
Mike Long

**Fresno State University**  
Joy Goto  
Alam Hasson

**Libby Labs**  
Gennady Borinshteyn  
Jeanine Boskovich

** Nexeo Solutions, LLC**  
Kenneth Forbes

**San Francisco State University**  
Zheng-Hui He  
Andrew Ichimura, HeatherRose Lacy

**University of California, Berkeley**  
Olaynka Olatunji-Ojo

## Students

### Summer I

- **University of Alaska-Fairbanks**  
  - Taylor Bergan

- **Jacksonville State University**  
  - Gwendell Thomas

- **California State University, Los Angeles**  
  - Judith Cuellar  
  - Alexander Mendizabal  
  - Ethan Ortiz  
  - Genesis Reyes Rivera

- **California State University, San Bernardino**  
  - Luis Enriquez-Contreras  
  - Alexis Vasquez

- **Chevron, Elaine Yamaguchi**  
  - Eric Hoang

- **Chevron Energy Technology Company**  
  - Maricela Hernandez  
  - Thang Le  
  - Mian Jalal  
  - Yao Zong Xu

- **Chevron Oronite Company LLC**  
  - Tenzin Lama  
  - Mian Shahab  
  - Tenzin Woeser

- **Chevron Products Company**  
  - Javier Escalante  
  - Itzel Gonzalez

- **Fresno State University**  
  - Tarandeepe Thamrait  
  - Alicia Nam

- **Libby Labs**  
  - Minh Nguyen

- **Nexeo Solutions, LLC**  
  - Valdemar Roman

- **San Francisco State University**  
  - Haowen Liu  
  - Tao Kwan  
  - Chuck Wong

- **University of California, Berkeley**  
  - Zhen Jie He
# 2015 Project SEED Summer I & II Programs

## Institutions/Coordinators/Mentors

<table>
<thead>
<tr>
<th>Institutions/Coordinators/Mentors</th>
<th>Students</th>
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<tr>
<td>Patti LiWang University of California, Merced</td>
<td>Eboni Bell</td>
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<td>Anand Subramaniam</td>
<td>Luis Garcia</td>
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<td>Andy LiWang</td>
<td>Jeanette Moua</td>
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<td>Vincent Tung</td>
<td>Lai Thung</td>
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<td>Ryan Baxter</td>
<td>Jerry Vue</td>
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<tr>
<td>Miki Park University of the Pacific, Stockton</td>
<td>Nuvia Cervantes Ordaz</td>
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<td>Andy Franz</td>
<td>Matteo Danforth</td>
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<tr>
<td>Qinliang Zhao</td>
<td>Bonvitcheh Ha</td>
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<td>Jerry Tsai</td>
<td>Anthony Nguyen</td>
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<td>William Chan</td>
<td>Sierra Turrieta</td>
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<td>Gary Banuelos USDA-ARS Water Management Research Lab.</td>
<td>Araceli Valencia</td>
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<td>Chris Wallis</td>
<td>Niu Dong, Colleen McMahan USDA-ARS Western Research Center</td>
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<td>Charles Burks</td>
<td>Aelafe Kebede</td>
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<td>Gerardo Lazo</td>
<td>Richard Kimball</td>
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<td>Sarah Throne</td>
<td>Dahlia Shahin</td>
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<td>Lawrence Wong</td>
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<td>Florence Wu, FeiFei Han Aemtek, Inc.</td>
<td>Summer II</td>
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<td>Brian Adzima Autodesk Inc.</td>
<td>Duong Huynh</td>
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<td>Chul Kim California State University, East Bay</td>
<td>Jia Yu</td>
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<td>Marlin Halim</td>
<td>Jennifer Law</td>
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<td>Weiming Wu San Francisco State University</td>
<td>Josue Chaves Montes</td>
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<td>Teaster Baird</td>
<td>Brandon Chan</td>
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<td>Tom Burns, Akiko Carver University of California, Berkeley</td>
<td>Lily Laili Xie</td>
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<td>Hrant Hratchian University of California, Merced</td>
<td>Thao Pham-Vu</td>
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<td>Erik Menke</td>
<td>Leonor Alcaraz-Guzman</td>
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<td>O. David Sparkman University of the Pacific, Stockton</td>
<td>Mary Xiong</td>
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<td>Spencer Walse USDA-ARS Water Management Research Lab.</td>
<td>Sereena Nand</td>
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<td>Stanford University, Kaye Storm</td>
<td>Alfredo Alvarez</td>
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<td>Co-coordinator – Nadia Shapiro</td>
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<td>Kim Parker Serena Chen</td>
<td>James Delgado</td>
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<td>Sara Kokkila Schumaher</td>
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</table>
## Institutions/Coordinators/Mentors

### The Scripps Research Institute, Dawn Eastmond
- Kurt Wuthrich, Pedro Serrano-Navarro
- Floyd Romesberg, Jorg Zimmermann

### University of California, Davis, Shota Atsumi
- Alexei Stuchebrukhov
- Shota Atsumi

- Louise Berben
- Kirill Kovnir, Susan Kauzlarich

### University of San Diego, Jessica Bell
- Christopher Daley

### Colorado State University, Pueblo, David Dillon
- David Dillon
- Sandra Bonetti

### University of Connecticut, Amy Howell
- Jose Gascon
- Jing Zhao
- Alfredo Angeles-Boza

### DuPont Central Research & Development, Sharon Haynie
- Sharon Haynie

### Chemical Society of Washington, Ajay Mallia
- Michael Massiah
- Akos Vertes
- Hanning Chen
- David Yang
- Timothy Warren
- George Washington University
- Alexis Mosby

### Students

#### Summer I
- Maria Ospina
- Jose Santiago
- Daniel Leung
- Joseph Johnston
- Carolina Lepe Banales
- Ali Keyani
- Franco Faucher
- Morgan Zardel-Casarez
- Mario Cruz
- Austin Korczynski
- Lauren Rosado
- Taina Quiles
- Kevin Seda
- Aisha Abdulkarimu
- Raubie Raiford
- Jenny Chen
- John Arcibal
- Jennifer Song
- Jasmine James
2015 Project SEED Summer I & II Programs

Institutions/Coordinators/Mentors

K. Travis Holman  Georgetown University
YuYe Tong
Zeeshan Ahmad  National Institute of Standards
James Fedchak  Thermodynamic Metrology Group
Michal Chojnack  Julia Scherschligt
James Fedchak  Thermodynamic Metrology Group
Michal Chojnack  Julia Scherschligt
K. Travis Holman  Georgetown University
YuYe Tong
Zeeshan Ahmad  National Institute of Standards
James Fedchak  Thermodynamic Metrology Group
Michal Chojnack  Julia Scherschligt
K. Travis Holman  Georgetown University
YuYe Tong
Zeeshan Ahmad  National Institute of Standards
James Fedchak  Thermodynamic Metrology Group
Michal Chojnack  Julia Scherschligt

Students

Monae Richardson
Leul Tesfaye
Tobo Rabemananjara
Andrew Almeida
Joe Amaya
Renard Petiangamba
Enjolique Chandler
Harrison Razanajatovo
Arian Mansur
Samar Shaqour
Marsha Edwards
Faillon Emmanuel
William Gilmore
Gabriel Muro
Najsha Sweeting
Kyle Hippalyte-Wade

FLORIDA

Barry University, George Fisher
Rajeev Prabhakar  University of Miami
John Berry  Florida International University

University of Miami, Paul Natland
Co-coordinator – Adam Braunschweig
Amy Scott
Adam Braunschweig
Francisco Raymo
Roger Leblanc
Marc Knecht, Randy Lawrence

Summer I
Arian Mansur
Samar Shaqour

Summer II
Marsha Edwards

GEORGIA

Clark Atlanta University, Ishrat Khan
Michael Williams
Ishrat Khan, Guangchang Zhou
James Reed

Summer I
Paresha Bowman
Tyquavious Kelley
Catherine Myrick
# 2015 Project SEED Summer I & II Programs

## Institutions/Coordinators/Mentors

<table>
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<tr>
<th>Institution</th>
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<td><strong>HAWAII</strong></td>
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<tr>
<td>Hawaii Local Section, ACS, David Cunningham</td>
<td>Tara Holitzki, Anne Veillet</td>
<td>Summer I Marybeth DeRegio, Jaynah Dias</td>
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<td><strong>IDAHO</strong></td>
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<td>Idaho State University, Andrew Holland</td>
<td>Andrew Holland, Joshua Pak</td>
<td>Summer I Andrew Hale, Nikiyah Melton</td>
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<td>Lisa Goss, Jeunghoon Lee, Caryn Evilia</td>
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<td>Snake River Local Section, ACS, Don Warner</td>
<td>Eric Brown, Kevin Ausman, Ken Cornell</td>
<td>Summer I Noah Collingwood, Mesiha Grbic, Jayde Nielsen, Anthony Phero</td>
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<td><strong>ILLINOIS</strong></td>
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<td>Chicago Local Section, ACS, Kathleen Mortell</td>
<td>Wei-Tsung Lee, Dali Liu, Miguel Ballicora</td>
<td>Summer I Jerrod Shaffer, Liam Darrah, Aimen Lateef</td>
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<td>Wei-Tsung Lee, Chad Eichman</td>
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<td>Indiana University/Purdue University (IUPUI)</td>
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<td>Purdue University, Bryan Boudouris</td>
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<td>University of Notre Dame, Mary Prorok</td>
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<td>Alex Kandel</td>
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<td>William Boggess, Michelle Joyce</td>
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## 2015 Project SEED Summer I & II Programs

### Institutions/Coordinators/Mentors

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<th>Institution/University</th>
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<td>Iowa State University, Javier Vela</td>
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<td>Levi Stanley</td>
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<td>Wichita State University, Syed Taher</td>
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<td><strong>LOUISIANA</strong></td>
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<tr>
<td>Louisiana State University-Shreveport, Brian Salvatore</td>
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<td>Summer I: Shacarria Calloway, La’Brittany Hill</td>
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<td>McNeese State University, Omar Christian</td>
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<td>Summer I: Naya Slaughter</td>
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<td>Summer II: Aaliyah Ardoin, DeMisha Brown</td>
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<td>Omar Christian</td>
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<td><strong>MARYLAND</strong></td>
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<td>Morgan State University, Louise Hellwig</td>
<td>Pumtiwitt McCarthy</td>
<td>Summer I: Jayda Smith</td>
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<td>Summer I: Idris Barakat, Danaisa Green</td>
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<td>Co-coordinator – Uche Udeochu</td>
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<td><strong>MASSACHUSETTS</strong></td>
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<td>Stonehill College, Cheryl Schnitzer</td>
<td>Deno Del Sesto</td>
<td>Summer I: Daem Celestin, Cesar Romero</td>
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<td>Louis Liotta</td>
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## 2015 Project SEED Summer I & II Programs

### Institutions/Coordinators/Mentors

#### MICHIGAN

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<td>Douglas Vander Griend</td>
<td>Eric Arnoys</td>
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<td>Adriyanna Jones</td>
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<td>Delta College, Bernadette Harkness</td>
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<td>Anja Mueller</td>
<td>Central Michigan University</td>
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<td>Henry Ford Community College, Keith Williams</td>
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<td>Kalamazoo Local Section, ACS, Donald Schreiber</td>
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<td>Michigan State University, Chrysoula Vasileiou</td>
<td>Co-coordinator – Babak Borhan</td>
<td>Robert Maleceka</td>
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### Students

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**Notes:**
- Summer I programs are listed first.
- Summer II programs are listed second.
- Mentors and coordinators are listed in order of appearance.
- Students are listed in order of appearance within each institution.
- Institutions, including the Local Section, are listed alphabetically.

---

**Contact Information:**
- For further details, please contact the respective coordinators or mentors listed.

---

**Additional Resources:**
- Visit the Project SEED website for updated information.
- Contact the Project SEED offices for assistance.

---

**Important Dates:**
- Summer I: [ prescribed dates ]
- Summer II: [ prescribed dates ]

---

**Support:**
- [List of supporters and funding sources]
2015 Project SEED Summer I & II Programs

Institutions/Coordinators/Mentors

MINNESOTA

University of Minnesota, Paul Boswell
Co-coordinator – Sarah Mullins

Lee Penn
Paul Boswell
Paul Fiesel, Jerry Cohen
Romas Kazlauskas
Christy Haynes
Wayland Noland, Mathew Huisenga

Rebecca Cuellar
Philippe Buhlmann
Paul Boswell

MISSOURI

Kansas City Local Section, ACS, Eckhard Hellmuth
Co-coordinators – Lincoln Maina, Thuong Dang Nguyen

Michelle Paquette
James Durig

Keith Buszek, Anusha Bade
Keith Buszek

Saint Louis University, Ryan McCulla
Ryan McCulla

University of Missouri, Saint Louis, Keith Stine
Eike Bauer

MISSISSIPPI

The University of Southern Mississippi, Douglas Masterson
Song Guo
Julie Pigza
Douglas Masterson

NEBRASKA

Doane College, Sharmin Sikich
Sharmin Sikich

University of Nebraska-Lincoln, Mark Griep
Barry Cheung
Marilyne Stains

Students

Summer I
Xatziri Viveros Aguilar
Samsam Dirie
Jinci Lu
Gloria Wang
Ka Xiong
Kenny Xiong

Summer II
Medinat Akindele
Kieu Ho
Peter Yang

Summer I
Chardonae Pendleton
Charese Tinsley

Summer II
Melissa McNearney
Maria De La Torre Romo

Summer I
April Lewis
Todd Welch

Summer I
Michael Gorges

Summer I
Elisha Acres
Fredeneshia Parker
Caleb Stanford

Summer II
Samantha Vogel

Summer I
Yousif Ibrahim
Elizabeth Otto
<table>
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<td><strong>University of Nevada, Reno, Laina Geary</strong></td>
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<tr>
<td>Christopher Jeffrey</td>
<td>Denise Flores-Frazier</td>
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<td>Laina Geary</td>
<td>Sava Karcher</td>
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<tr>
<td>Matthew Tucker</td>
<td>Gerald Roscom</td>
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<td>Ana de Bettencourt-Dias</td>
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<td><strong>Dartmouth College, Ivan Aprahamian</strong></td>
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<tr>
<td>Ivan Aprahamian</td>
<td>Nicholas Chambers</td>
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<td>Polina Pivak</td>
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<td><strong>Academy for Enrichment &amp; Advancement, Union City High School, Amanda Smith</strong></td>
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<tr>
<td>Philip Leopold</td>
<td>Josie Martinez</td>
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<td>Kevin Olsen</td>
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<td>Rajesh Dave</td>
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<td><strong>Summer II</strong></td>
<td>Allison Guajala</td>
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<td>Clemont Alo</td>
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<td><strong>Academy for Enrichment &amp; Advancement, Union City High School, Nadia Makar</strong></td>
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## Institutions/Coordinators/Mentors

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<tr>
<td>Tianning Diao, New York University</td>
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<td>Robert Weider, University of Medicine and Dentistry of New Jersey (UMDNJ)</td>
<td>Jessica Alvitres, Emily Tumbaco</td>
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<td>Hongiun Wang, Stevens Institute of Technology</td>
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<td><strong>New Jersey Institute of Technology</strong>, Leslie Williams</td>
<td>N. M. Ravindra</td>
<td>Manuella Agyei, Keia Smith</td>
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<td><strong>Rowan University</strong>, Gregory Caputo</td>
<td>Lark Perez, Timothy Vaden</td>
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<td>Daniel Seidel, Alan Goldman</td>
<td>Jose Hernandez-Morales, Ashley Lopez</td>
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<td>Frieder Jaekle, Huixin He</td>
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<td><strong>Rutgers, The State University of New Jersey</strong>, Deborah Stalling</td>
<td>Nanjoo Suh, Suzie Chen</td>
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<td>Stavroula Sofou</td>
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<td><strong>Seton Hall University</strong>, Cecilia Marzabadi</td>
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**Co-coordinator – Gerald Buonopane**

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<td>Rhonda Quinn</td>
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| New Mexico Highlands University, Carol Linder  
  Carol Linder  
  Co-coordinator – Amy Tapia  
  Bernadette Hernandez-Sanchez  
  Timothy Boyle  
  Thao Nguyen  
  Selena Tran-Jurado |
| **NEW YORK**           |          |
| Ellis Preparatory Academy, Jeremy Heyman  
  Luis Campos  
  Kristin Myers  
  Bart Kahr  
  New York University  
  Abby Andullah  
  Ayele Ayih  
  Raushan Rupak  
  Katherine Garcia Gil |
| Rochester Institute of Technology, Lea Vacca Michel  
  John-David Rocha  
  Callie Babbitt  
  Gabrielle Gaustad  
  Rochester Institute of Technology  
  Austin Hammond  
  Shally Lin  
  James Weathers |
| **NORTH CAROLINA**     |          |
| North Carolina University, Laura Sremaniak  
  Micheal Fitzgerald  
  Weitao Yang  
  Benjamin Wiley  
  Gavin Williams  
  Melissa Pasquinelli  
  Jillian Dempsey  
  James Cahoon  
  University of North Carolina-Chapel Hill  
  Chidubem Nwakuche  
  Samuel Ndukwe  
  Cyrus Lett  
  Joshua Zhou  
  Alan Tonelli  
  Joshua Pierce  
  North Carolina State University  
  North Carolina State University  
  Abbott Ndukwe  
  Jackline Omweno |

---

**Summer I**  
Batch Clerizier  
Vivian Igwagu  
Ulisses Villalobos  
Thao Nguyen  
Selena Tran-Jurado  
Abir Andullah  
Ayele Ayih  
Raushan Rupak  
Katherine Garcia Gil  
Austin Hammond  
Shally Lin  
James Weathers  
Betelihem Mebrahtu  
Donovan Miller  
Benhor Samson  
Chidubem Nwakuche  
Samuel Ndukwe  
Cyrus Lett  
Joshua Zhou  
Abbott Ndukwe  
Jackline Omweno
2015 Project SEED Summer I & II Programs

Institutions/Coordinators/Mentors

University of North Carolina, Charlotte, Thomas Schmedake
Daniel Rabinovich
Michael Walter

North Dakota State University, Seth Rasmussen
Seth Rasmussen

Akron Local Section, ACS, Tama Drenski
Chris Ziegler
Ali Djinowala
Jia Li
Abraham Joy
Yu Zhu
Thomas Leeper

Kevin Cavicchi
Chrys Wesdemiotis
Charles Moorefield, George Newkome
Machael Konopka

Case Western Reserve University, Carlos Crespo-Hernandez
Co-coordinator – Kathryn Howard
Daniel Scherson
Chris Dealwis
Rajesh Viswanathan
Carlos Crespo-Hernandez
Rohan Akolkar
Emily Pentzer

Emily Pentzer
Clemens Burda
Carlos Crespo-Hernandez
Blanton Tolbert

University of Cincinnati, Eddie Merino
James Mack
Anna Gudmundsdottir
Laura Sagle

University of Toledo, Andy Jorgensen
Jianglong Zhu
W. Ajith Karunarathne

Students

Summer I
Julio Casanova
Pokyes Kromtit

Summer I
Katlyn Benedict

Summer I
Tailon Burrell
Muqadas Diab
Tabitha Graves
Sean Jeffreys
Tyrice Pace
Anjellah Vang

Summer II
Spencer Lewis
Ryan Prickler
Demi Reed
Destiny West

Summer I
Ikechukwu Chukwukere
Antonio Colon
Rayne Elder
Frankie Santiago-Perez
Michael Sebring
Stasha Vaden

Summer II
Daphney Bonner
Anson Hiew
Erica Truong
Tiara Yarber

Summer I
Derek Blankenship
Khadyjah Diaw
Isaiah Howard

Summer I
Sabrine Ayoub
Sabrina Cereceres
2015 Project SEED Summer I & II Programs

Institutions/Coordinators/Mentors

Amanda Bryant-Friedrich             University of Toledo
Jared Anderson
Cora Lind-Kovacs

Youngstown State University, Sherri Lovelace-Cameron
Tom Oder
Sherri Lovelace-Cameron

Sherri Lovelace-Cameron

OREGON

Portland Local Section, ACS, Angela Hoffman
Angela Hoffman             Portland State University
Theresa McCormick

PENNSYLVANIA

Bayer MaterialScience LLC, Irene McGee
Robyn Francis

Eric Rexrode

Duquesne University, Jennifer Aitken
David Seybert
Partha Basu, Sara Dille

Michael Van Stipdonk, Khiry Patterson
Stephanie Wetzel

Ellen Gawalt
Jennifer Aitken
Jeffry Madura, Bernandie Jean
Michael Cascio, Elizabeth Perez

The Forensics Sciences Mentoring Institute, Barry Logan
Kimberlee Moran, Keith Temporal
Mandi Mohr

Amanda Haggerty

Kimberlee Moran
Keith Temporal

Students

Summer II
Samar Ayoub
Harmonie Christian-Ulmer
Tamia Reditt

Summer I
Christian Peck
David Polonus

Summer II
Alyssa Blosser

Summer I
Jessica Chung
Helen Vasquez-Sanchez

Summer I
Brian Foster
Onyan Sheely

Summer II
Tyler Coleman

Summer I
Amadou Diallo
Jeramiah Jones
Sarine McKenzie
Jordan Pestok
Angel Williamson-Wheat

Summer II
Nadeja Kodjo
Amber Latona
Stephen Lau
Cheyeanne Perez

Summer I
Ibrahim Alhassan
Mandisa Bostwick
Joshua Bryan-Brown
Margeshay Tomlinson

Summer II
Alonzo Elias
### 2015 Project SEED Summer I & II Programs

#### Institutions/Coordinators/Mentors

**PUERTO RICO**

**Puerto Rico Local Section, ACS, Ingrid Montes**

- Carlos Gonzalez  
- Eduardo Nicolau  
- Jose Lasalde  
- Arthur Tinoco  
- Dalice Piñero-Cruz

**Students**

- **Summer I**
  - Sernelies Arroyo  
  - Caleb Colon  
  - Stefannie Morales  
  - Graciela Gautier  
  - Mary Martinez  
  - Oliver Pichardo

- **Summer II**
  - Carlos Huang-Zhu  
  - Nicole Zambrana

---

**SOUTH CAROLINA**

**University of South Carolina, Chuanbing Tang**

- Hui Wang  
- Brian Benicewicz  
- Aaron Vannucci

**Students**

- **Summer I**
  - Jason Lee  
  - Nia Livingson  
  - Zana Mack

- **Summer II**
  - Ke'Shawna Brown  
  - Alexis Jones  
  - Maria Maechtle  
  - Linda Taylor

---

**TENNESSEE**

**LeMoyne-Owen College, Yahia Hamada**

- Yahia Hamada

**Middle Tennessee State University, Paul Gregory Van Patten**

- Paul Gregory Van Patten

---

**TEXAS**

**Greater Houston Local Section, ACS, Carolyn Burnley**

- Co-coordinator – Oluwatooyin Asojo

**Students**

- **Summer I**
  - Samantha Clem  
  - Shelsea Portillo  
  - Saralene Nunley

- **Summer II**
  - Cristian Cachado  
  - Ngoc Minh Pham

- David Thompson  
- Francesco DeMayo  
- B. Montgomery Pettitt  
- Kjersti Aagaard  
- Oluwatooyin Asojo  
- Sam Houston State University  
- Baylor College of Medicine  
- University of Texas Medical Branch  
- Baylor College of Medicine
## Institutions/Coordinators/Mentors

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<tr>
<th>Institutions/Asilo</th>
<th>Coordinators/Mentors</th>
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<tr>
<td>Gururaj Neelgund</td>
<td>Prairie View University</td>
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<td>Gina Chiarella</td>
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<td><strong>San Antonio Local Section, ACS, E. Robert Fanick</strong></td>
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<td>Carol Ellis-Terrell</td>
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<td>Tom Chang</td>
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<td>Nicholas Dickenson</td>
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<td><strong>University of Vermont, Rory Waterman</strong></td>
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<td>Matthias Brewer</td>
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<td>Matthew Liptak</td>
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## Students

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<td>Chrisan-Kay Clarke</td>
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<td>Richard Qian</td>
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<td>Ryann Cartwright</td>
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<td><strong>Summer I</strong></td>
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<td>Ashlyn Bain</td>
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<td>Raul Carreon</td>
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<td>Max Chee-Garcia</td>
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<td>Sandra Figueroa</td>
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<td>Lynee Massey</td>
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<td>Ramiro Nava</td>
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<td>Jamie Turcios-Villalta</td>
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<td>Samantha Alderete</td>
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<td>Gabriella Martinez</td>
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<td>Nina Filippova</td>
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<td>Asma Rokhaneevna</td>
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<td><strong>Summer I</strong></td>
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<td>Courtney Christensen</td>
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<td>Margaret Winona Bhushan</td>
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<td>Crystal Vejar</td>
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<td><strong>Summer I</strong></td>
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<td>Kevin Huang</td>
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<td>Pabitra Sharma</td>
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2015 Project SEED Summer I & II Programs

Institutions/Coordinators/Mentors

Rory Waterman  University of Vermont

WISCONSIN

Medical College of Wisconsin, Michael Mathias
John Corbett

University of Wisconsin, Milwaukee, A. Andrew Pacheco
A. Andrew Pacheco

Summer II
Musweki Antoinette Mutume

Summer I
Amina Wyatt-Ngoml
Jewel Morris

WEST VIRGINIA

Marshall University, Derrick Kolling
John Rakus
Michael Norton

West Virginia State University, Michael Fultz
Michael Fultz

Summer I
Brittany Ross
Scarlett Scarberry

Summer I
Katelyn Damron
George Wilkinson

The Forensic Sciences Mentoring Institute, Pa.
2015–2016 College Scholarship Recipients

Alfred and Isabel Bader Scholars

Alfred Bader is one of the founders of the Sigma-Aldrich Company, today Sigma–Aldrich Co. Alfred and Isabel Bader have generously contributed to Project SEED over the years. In 1992 their support started the Summer II program and have since 1997 supported the Project SEED college scholarships.

Medinat Akindele
High School: Harding High School, St. Paul, Minn.
SEED Institution: University of Minnesota, St. Paul
SEED Mentor: Molly Kreiser
University of Minnesota, Twin Cities, St. Paul
Major: Chemistry

Aaliyah Ardoin
High School: Washington Marion Magnet High School, Lake Charles, La.
SEED Institution: McNeese State University, Lake Charles, La.
SEED Mentor: Ron Darbeau
McNeese State University, Lake Charles, La.
Major: Chemistry

Maria De LaTorre
High School: East High School, Kansas, Mo.
SEED Institution: University of Missouri – Kansas City, Mo.
SEED Mentor: James Durig
Kansas State University, Manhattan, Kans.
Major: Chemical Engineering

Jael Estrada
High School: Union City High School, Union City, N.J.
SEED Institution: Drew University, Madison, N.J.
SEED Mentor: Ryan Hinrich
Drew University, Madison, N.J.
Major: Environmental Studies & Sustainability

Mateo Gonzalez
High School: Century High School, Pocatello, Idaho
SEED Institution: Idaho State University, Pocatello, Idaho
SEED Mentor: Rene Rodriguez
Idaho State University, Pocatello
Major: Chemistry

Calley Hickman
High School: Morris Area High School, Morris, Minn.
SEED Institution: University of Minnesota, Morris
SEED Mentor: Ted Pappenfus
University of Minnesota, Morris
Major: Chemistry
Carlos Huang
High School: Academia Bautista de Puerto Nuevo, PR
SEED Institution: University of Puerto Rico, Rio Piedras, PR
SEED Mentor: Jose Prieto
University of Puerto Rico, Mayaguez, PR
Major: Chemical Engineering

SangHo Jee
High School: Old Mill High School, Millersville, Md.
SEED Institution: University of Maryland, College Park, Md.
SEED Mentor: Zhihong Nie
University of Maryland, College Park, Md.
Major: Biochemistry

Imran Khan
High School: Niles West High School, Skokie, Ill.
SEED Institution: Loyola University, Chicago, Ill.
SEED Mentor: Rick Holz
Northwestern University, Evanston, Ill.
Major: Integrated Science

Carisa Medina-Abrajan
High School: East High School, Pueblo, Colo.
SEED Institution: Colorado State University, Pueblo
SEED Mentor: Sandra Bonetti
Colorado State University, Pueblo
Major: Biochemistry

Camila Morocho
High School: Science Park High School, Newark, N.J.
SEED Institution: Public Health Research Institute Center of Rutgers, Newark, N.J.
SEED Mentor: Yaakov Saturen & Eliseo Eugenin
New York University
Major: Chemical & Biomolecular Engineering

Sereena Nand
High School: Stagg High School, Stockton, Calif.
SEED Institution: University of the Pacific, Stockton, Calif.
SEED Mentor: Roshanak Rahimian
University of California, Los Angeles
Major: Biochemistry

Faith Ogbennaya
High School: Saint Vincent Academy, Newark, N.J.
SEED Institution: The Public Health Research Institute at ICPH, Newark, N.J.
SEED Mentor: John Mavrianos
Drew University, Madison, N.J.
Major: Biochemistry

Ngoc Pham
High School: Westbury Senior High School, Houston, Tex.
SEED Institution: Shell Global Solutions, Houston, Tex.
SEED Mentor: Pierre Tutunjian, Pat Killough, Dave Denley
Houston Baptist University, Houston, Tex.
Major: Chemistry
**Nina Raymundo**
High School: Lawrence North High School, Indianapolis, Ind.
SEED Institution: Methodist Res. Institute, Indianapolis, Ind.
SEED Mentor: Maria Teresa Rizzo
Indiana University, Bloomington, Ind.
Major: Biochemistry

**Cristin Reno**
High School: Southview High School, Sylvania, Ohio
SEED Institution: The University of Toledo, Ohio
SEED Mentor: Jianglong Zhu
The University of Toledo, Ohio
Major: Chemical Engineering

**Jamarii Robinson**
High School: Mississippi School for Mathematics and Science, Columbus, Miss.
SEED Institution: University of Southern Mississippi, Hattiesburg, Miss.
SEED Mentor: Douglas Masterson
Mississippi State University
Major: Chemical Engineering

**Claudia Torres**
High School: Kent Place School, Summit, N.J.
SEED Institution: Rutgers University, Newark, N.J.
SEED Mentor: Huixin He
Yale University, New Haven, Conn.
Major: Molecular Biochemistry

**Brooklynn Trujillo**
High School: South High School, Denver, Colo.
SEED Institution: Colorado State University, Pueblo
SEED Mentor: Matthew Cranswick
Colorado State University, Pueblo
Major: Chemistry

**Jade Tso**
High School: Franklin High School, Elk Grove, Calif.
SEED Institution: USDA Western Human Nutrition Research Center, Davis, Calif.
SEED Mentor: Betty J Burri
Duke University, Durham, N.C.
Major: Chemistry
2015–2016 College Scholarship Recipients

Ashland Scholars

Ashland Inc. is a leading global company which provides specialty chemicals, technologies and expertise to customers worldwide. Since 2011, Ashland Inc. has sponsored Project SEED alumni.

Samar Ayoub
High School: Sylvania Southview High School, Sylvania, Ohio
SEED Institution: University of Toledo, Ohio
SEED Mentor: Amanda Bryant-Friedrich
University of Toledo, Ohio

Destiny West
High School: Firestone High School, Akron, Ohio
SEED Institution: The University of Akron, Ohio
SEED Mentor: Michael Konopka
The Ohio State University, Columbus

Bayer Scholars

The Bayer Foundation contributed to the Project SEED Endowment. Bayer is a research based company with major businesses in health care and life sciences as well as chemicals and imaging technologies. Since 1993, Bayer has supported Project SEED alumni.

Carolina Banales
High School: Florin High School, Sacramento, Calif.
SEED Institution: University of California, Davis
SEED Mentor: Natalia Loewen
University of California, Davis
Major: Biochemistry

Timothy Chen
High School: Green Hope High School, Cary, N.C.
SEED Institution: North Carolina State University, Raleigh
SEED Mentor: Melissa Pasquinelli
University: North Carolina State University, Raleigh

Aparna Chintapalli
High School: Homestead High School, Cupertino, Calif.
SEED Institution: Ball State University, Muncie, Ind.
SEED Mentor: Robert Sammelson
Pomona College, Claremont, Calif.

Judith Cruz Lopez
High School: Vineland High School, Vineland, N.J.
SEED Institution: Rowan University, Glassboro, N.J.
SEED Mentor: Timothy Vaden
University: Rowan University, Glassboro, N.J
Major: Chemical Engineering

Fosbinder Scholars

The Estate of Elizabeth Ernest Fosbinder, wife of late ACS member, Dr. Russel J. Fosbinder stipulated the establishment of an endowment in honor of Dr. Fosbinder to fund college scholarships for graduates of Project SEED. Since 2004, the endowment has supported Project SEED alumni.

Anthony Nguyen
High School: Tualatin High School, Tualatin, Oreg.
SEED Institution: University of Portland, Oreg.
SEED Mentor: Angela Hoffman
University of Portland, Oreg.
Major: Biochemistry

Alexis Parks
High School: Coconino High School, Flagstaff, Ariz.
SEED Institution: Northern Arizona University, Flagstaff, Ariz.
Mentor: Jani Ingram
Northern Arizona University, Flagstaff, Ariz
Major: Chemistry
2015–2016 College Scholarship Recipients

Ullyot Scholars

Glenn and Barbara Ullyot. Glenn Ullyot worked for Smith, Kline & French Laboratories. He was a major contributor to the discovery and manufacture of new drugs to the medical world. Barbara Ullyot had a management career at ACS and was a valuable member. Glenn and Barbara provided college scholarships to Project SEED students over their lifetime.

Laan Yeung
High School: West Lafayette High School, West Lafayette, Ind.
SEED Institution: Purdue University, West Lafayette, Ind.
SEED Mentor: Julie Liu
Harvard University, Cambridge, Mass.
Major: Biochemistry

Ciba Specialty Chemicals Scholars

CIBA Specialty Chemicals was a leading global chemical company acquired by BASF in 2008. The Ciba Foundation made a generous legacy gift to the American Chemical Society to establish the Ciba Specialty Chemicals Scholars Endowment, a new component added to the Project SEED college scholarship program, which expanded the one-year Project SEED college scholarships to a three-year renewable scholarship. As of today, 11 of the 18 awardees have graduated in the chemical science.

Sonali Mali is a sophomore at Indiana University, Bloomington, Ind. Sonali is majoring in Biochemistry.

Seth Reasoner is a sophomore at Berea College, Berea, KY. Seth is majoring in Chemistry.

William Wey is a sophomore at Vanderbilt University, Nashville, Tenn. William is majoring in Chemistry.

ACS Project SEED Scholars

Li Xu
High School: Galileo Academy of Science & Technology, San Francisco, Calif.
SEED Institution: San Francisco State University, Calif.
SEED Mentor: Zheng Hui He
University of California, Irvine
Major: Pharmaceutical Sciences

Andy Zhang
High School: Wheaton High School, Silver Spring, Md.
SEED Institution: Georgetown University, Washington, D.C.
SEED Mentor: Richard Weiss
University of Maryland, College Park, Md.
Major: Biochemistry
Bader Scholar: Aaliyah Ardoin, Washington Marion Magnet High School, Lake Charles, La
Mentor: Dr. Ron Darbeau
SEED Institution: McNeese State University, Lake Charles, La

“German physical chemist, Walther Hermann Nernst, once said “Knowledge is the death of research.” Although some may view this statement as true, others may deem this statement to be false. I disagree with this statement simply because I believe that gaining knowledge only opens doors for more research. As humans, we always want something better than what we have. Research can be viewed as the stepping stone for life as we know it, without it people would know and have very little. This past summer, I had the pleasure of working with Dr. Ron Darbeau, along with some of his students, studying amides. Amides belong to an organic functional group and contain a carbonyl group. To be more specific, I researched the yield of N-Nitrosation of N-Benzylpivalamides. The idea of the project was to create a solution that would consequently produce the most yield. This included learning how to handle various types of lab equipment, learning about chemicals and what they are used for, and also just simply getting the feel of what a real lab would be like. With each trial, I added sodium bicarbonate to the benzylamine and pivaloyl chloride solution to find what method would create the largest yield of product. The results of the project showed me that adding a base like sodium bicarbonate would create the biggest yield of product. The more product I had, the more crystals would be formed. These crystals could then be used to create TLC’s (Thin Layer Chromatography’s), check melting and boiling points, or can be stored for further experimentation. This was a fun, easy, and well planned way to figure which solutions are easiest to work with and which ones would be great for further study. The SEED program was an overall great experience. As an unprivileged student, I did not know there were such interesting things going on in a chemistry lab. Although research is very time consuming, getting the results you hope for can make you a very happy camper. Not only did the program make me look forward to working in the lab, in the future, but it made me think about how little research can make such a big difference in people’s lives. Experiments such as the one I performed can be used in both chemistry and medical fields thus can help many people. By saying this, the program has influenced me to major in chemistry pre-medicine and become an anesthesiologist. Not only do I want to help administer medicine but I would like to do research along with others and help advance medicine that will be used well past my lifetime. It has helped me grow into a very independent young woman and has helped me become curious and eager to learn than ever before. I thank Dr. Darbeau for his mentoring and hope to work with him again very soon.”

Ashland Scholar: Samar Ayoub, Sylvania Southview High School, Sylvania, Ohio
Mentor: Amanda Bryant-Friedrich
SEED Institution: University of Toledo, Ohio

“My motivation to participate in Project SEED stemmed from my passion to explore a world of unknown and partake in research where I may not always find exact answers but will constantly acquire knowledge. Being a part of this program allotted me the opportunity to familiarize myself with a real-life chemistry lab. Conducting basic experiments in chemistry class were no comparison to the sophisticated and complex procedures I followed in the lab. In Project SEED, I had the chance to choose my own route: I could follow whatever path I desired. Because the idea of creating new things fascinated me, I decided to synthesize organic molecules. Specifically, I aimed to predict the possible small molecule metabolites formed as a result of oxidative damage to the 2-deoxyribose sugar of thymidine. The experiment was not something I completed overnight; there were multiple steps that needed to be taken into account, as well as critical thinking and trial and error. I became very familiar with research tools and terms such as placing reaction mixtures onto rotovaps, conducting TLCs (Thin Layer Chromatography), and examining data from NMRs (Nuclear Magnetic Resonance) and MALDI (Matrix Assisted Laser Desorption/Ionization). Though I could not identify the exact molecule I created at the end of my experiment, I did construct possible sugar structures from the three unknown peaks of the H-NMR. Through completing Project SEED, I have become more confident upon the path to my future as a medical professional.
The world of medicine has intrigued me ever since I was a child. My parents would often find me watching scenes from Grey's Anatomy on TV, awestruck by how efficiently a physician must work and how quickly a patient can slip from one wrong move. Project SEED placed me in the middle of the action. I could mix chemicals together, and when I did not receive the desired results, I had to think. I had to rationalize my next step; there were no guideline to follow if a reaction mixture turned orange. Working in a lab over the summer taught me to further analyze my decisions, to find answers to difficult questions, to create an alternative method when the first one did not work - and I enjoyed every second of it. This program has indirectly prepared me for my future in medicine, where I have to be comfortable with thinking on my feet and discovering new solutions. If a patient has difficulty breathing, and CPR (Cardiopulmonary Resuscitation) does not work, I cannot just quit. I cannot pronounce that there is nothing more I can do. Instead, I sift through the possibilities and place a breathing tube down their throat to start intubation. Project SEED helped me not only grow as a person, but as a future physician. It also taught me that there is always another way - there are different routes to achieving your goal. Though finally reaching your goal can produce a “feel-good feeling,” it is the trail you take to deprotect that 3’ ketone of thymidine that is of great value. This program has provided me with life skills that have further guided me on my path to becoming a physician.”

Bayer Scholar: Judith Cruz Lopez, Vineland High School, Vineland, N.J.
Mentor: Timothy Vaden
SEED Institution: Rowan University, Glassboro, N.J.

I shall beginning my essay by thanking the American Chemical Society, Rowan University’s Science Department, and my AP Chemistry teacher for allowing me to participate in a wonderful experience that Project SEED gave me. Working on chemical research at a nearby university last summer has taught many new techniques. I began my journey working under Dr. Lei Yu and Dr. Timothy Vaden’s guidance. Our research team succeeded in finding a comprehensive set of data from multiple tests that showed how BMIBF₄ and Acetic Acid react to one another at different concentrations. These tests included GCMS, IR (Infrared) spectroscopy, Electric Conductivity, and Raman Spectroscopy. The entire purpose of performing the experiments is to find if BMIBF₄ (1-methyl-3butylimidazolium tetrafluoroborate) combined with Glacial Acetic Acid would have a high proton concentration. We also sought to find high conductivity in this solution. With both those tests showing positive data, the team hoped that the findings were precise enough to be considered as a replacement for Nafion, a polymer that has grown into a well-used fuel cell material, to provide a more dependent and trustworthy fuel cell. The GCMS was an instrument used to separate the chemical mixture into pulses of pure chemical. The following instrument used was the IR, it was used to analysis the infrared light interacting with the molecules in each solution. Conductivity tests were conducted to draw conclusions about the presence of ions in these solutions. Our overall data wasn't a proper conclusion to sternly say that any of the solutions can or cannot be used as a replacement fuel cell. More tests should be conducted such as the Calorimetry test. Overall, time, patience and attention is learned throughout these experiments. They explained all the instruments used and their functions. The purpose of the research was to find a solution that would block the LasR chemical signal from being translated by the bacteria. If this happens, the bacteria could no longer attack the human body. The bacterium Pseudomonas Aeurignosa was the target of the experiments. To conduct every experiment, a combination of a Roto-Vap, a NMR, and an automated flash purification (AAFP) machine were used. The Rotary Evaporator helped to get rid of any unwanted solvent from the solutions. The NMR was used to ensure the correct compound was created after experimentation, and the AAFP was used to purify each solution. Project SEED has influenced me into majoring in chemistry. Before entering the program I grew to love chemistry from my high school studies but by the end of the summer I knew chemistry would be my intended major. My goal is to become a Cosmetic Chemist and engineer products. I’ve been accepted into every chemistry program at every university I’ve applied to. I’m more than thankful for have had the opportunity to study chemistry at a higher level and with that I can be a step ahead in life.”
2015 Project SEED Students Testimonials

Bader Scholar: **Mateo Gonzalez**, Century High School, Pocatello, Idaho
Mentor: Rene Rodriguez
SEED Institution: Idaho State University, Pocatello

The SEED Experience at ISU Many residents, especially of high school age, residing in the Pocatello Idaho area are unaware of what goes on within their city limits. After undergoing a transformation that is participating in Project SEED, I was able to access the “secrets” of the city and the life that was available to me through university education. Dr. Rodriguez and the other awesome professors at the ISU Chemistry department spent eight weeks introducing me to Atomic Chemical Vapor Deposition (ACVD), Plasma Enhanced Chemical Vapor Deposition (PECVD), Raman Spectroscopy, Writing scientific reports, and many more concepts. Many concepts and experiments I would not have experienced, or known about otherwise. Attending the department picnic on the second day of the program really introduced me to the impact of education. Meeting other students was eye opening. There were students from all over the world. They had all come to study Chemistry in Pocatello, Idaho; a small town of 54,000 people. These students all departed into the vast unknown travelling hundreds, even thousands of miles to have an exceptional education that focused on their learning personally. I returned to the laboratory the next day, filled with a new vigor to get the most out of the program. That’s when Dr. Rodriguez first introduced another student, Fadil. He explained concepts so foreign that I couldn’t compute them. The goal was to investigate the effect of Tin (II) Chloride in Germanium Sulfide thin films. To reach this goal we investigated the formation of conductive bridges from the Silver and Aluminum through a Germanium Sulfide Thin Film Dielectric. We made many samples and went through the painstaking process of wrapping glass slides individually with aluminum foil in accordance with each area that needed to be covered in the PECVD and ACVD procedures. Then after completing device prototypes with different amounts of each chemical compound at different thicknesses they were tested to see if they displayed the desired results. The desired results were a control of electrical current through the formation and creation of the conductive bridges through the dielectric. The results however were well worth it once we, Fadil and I, presented the poster for our project at the ACS NORM conference in Missoula Montana. We were able to demonstrate the different configurations that provided the best results, and how other results were not expected as well. Dr. Pak said, “A bachelor’s degree is not enough anymore. To compete, you should have at least a master’s degree.” There I decided to not only complete my education for sure, but I also decided that there are other more fulfilling careers than medicine. I decided that I would change the world by becoming a chemical engineer or chemist who would work on new methods to grow industry only more fuel efficient. Until then that is how Project SEED has influenced me, and I just hope I can participate one more time.

Bader Scholar: **SangHo Jee**, Old Mill High School, Millersville, Md.
Mentor: Zhihong Nie
SEED Institution: University of Maryland (UMD), College Park

“Participating in the Project SEED I and II during the summers has helped me grow as both a professional and an individual. I worked with Dr. Nie at the University of Maryland, College Park in studying the effect of small dye molecules as model drugs on the self-assembly of hybrid nanoparticles. In my research I synthesized gold nanoparticles and tethered them to amphiphilic diblock copolymers that when exposed to polar solvents such as water, self-assembled. With the goal of drug delivery, I used small dye molecules to observe the effects of drug loading on the morphology and the optical properties of the vesicles formed. Project SEED has helped me see how research is an effective tool at both discovering new materials and methods, as well as refining existing techniques. This applies to my work at UMD because I had to research the new assemblies that resulted from the addition of the dye molecules and study exactly how much dye was loaded into the drug assembly. However, in order for me to quantify the dyes, I had to consult literature on how it was done previously and adapt the techniques to the equipment and materials I had in order to get accurate data. Through my experiences, I learned why science is a valuable tool and how research occurs in real life. I had the chance through Project SEED to experience the difficult task of confidently reporting my data through the repetition of observations. Science to me has become an experience beyond the textbook or a
list of steps given to me to follow. It is about controlling all variables, changing them or making them constant, and having repeated experiments to truly establish a cause and effect relationship. As a part of Project SEED, I had to design my own procedures and experiments, collect and analyze data, and compile it into a report that I can present. This experiment has helped me both educationally and professionally. Being able to design good experiments and carry them out has helped me tremendously in high school and will be invaluable in college. Even the most basic skills such as using a pipet correctly to more advanced skills such as operating a UV-Vis spectrometer is a necessity in experiments ranging from basic school labs to research opportunities as an undergraduate. I had the opportunity to develop as a professional and my career outlooks have changed due to Project SEED. Using the data from the research, I was able to present at the Project SEED symposium as well as the Mid-Atlantic Soft Matter Conference at Georgetown. It was a valuable experience for me to be able to present my research in front of others. I was allowed to be a part of the research community and talk to those in it. Research as a career has been opened to me because I now have exposure and connections to people in the field. Now I’ll be able to research during my undergraduate studies as well as afterwards. The course of my life has been changed by Project SEED and the invaluable experience it gave me.”

Bader Scholar: Camila Morocho, Science Park High School, Newark, N.J.
Mentor: Yaakov Saturen and Eliseo Eugenin
SEED Institution: New York University

“In the summer of 2014, I had the opportunity to intern at the Public Health Research Institute (PHRI) in New Jersey's Medical School. The fellowship allowed me to conduct research and work among postdoctoral students where I learned that science was about combined failures and discoveries, and it was then that I realized that medical discoveries would not be possible without the tools used to do so. I had the pleasure of working with Eliseo Eugenin, Ph.D. which was my mentor and principal investigator, and I researched the Role of Lipids in the Pathogenesis of Accelerated Atherosclerosis in HIV-Infected Individuals. It was during my experience that I discovered that science and engineering is the piecing together of various subjects to innovate and improve human life. I want to create innovative technology to help others in the medical field, thus my interest in biomedical engineering immersed. I want to do more than just conduct research in the limits of a laboratory like I did over the summer because, ultimately I want to be able to apply scientific concepts that I will learn in the classroom and lab onto solving real world issues and ultimately be responsible for bridging people and other subject areas together to develop a creation. The Summer Internship program has been such a fulfilling experience rather than just an average internship. I have not only gained knowledge on research and careers in science but who I am as a person and what I want to pursue in life. I loved how my experience allowed me to enter science realm and investigate issues hands on rather than merely reading on the topic. Through the Project Seed experience I have started my path to becoming great scientist and engineer, and who knows where this journey will take me!

Fosbinder Scholar: Anthony Nguyen, Tualatin High School, Tualatin, Oreg.
Mentor: Angela Hoffman
SEED Institution: University of Portland, Oreg.

“My experience with Project SEED has not only provided me with valuable skills that are applicable to both school and everyday life but also created an opportunity for me to explore a career in the chemistry field. A useful skill that I acquired from this program is being acquisitive. This skill proved to be useful in my science classes as it allowed me to observe, gather data, and research at a quick and steady pace. My scientific understanding has also improved as I can now analyze research articles and seek out relevant information required for my research. Within the professional environment, I am able to learn how to communicate effectively to my professor, allowing me to build a professional relationship. My research experiment was on a
cytotoxic alkaloid, which is produced from a local plant called Cephalotaxus harringtonia. Alkaloids are nitrogenous organic compounds found typically in plants. There are many types of alkaloids that are used often in daily life, ranging from pesticides to chemotherapeutic drugs. C. harringtonia was chosen for this experiment because of its relation to the Pacific Yew tree, a well-known plant that produces an anti-cancer drug called Taxol. Since C. harringtonia displayed signs of resistant against pesticide and fungal infections, questions were raised whether the compound in this plant could become the next anti-microbial agent or even an anti-tumor molecule. The first method in identifying the alkaloid compound is extraction. This involves grinding up the stems and leaves from the plant and soaking them in a methanol bath for at least 2 hours. The solution is then filtered to separate the solids from the liquid. The liquid is placed into a rotary-evaporator to evaporate the methanol in the solution. The crude alkaloid extract is then placed into a solid-phase extractor to separate the molecules based on their physical and chemical properties. Once the molecules have been separated, the sample is then separated even further, using a Revelers machine, to isolate molecules based on their solubility, known as fractionation. After this step, each fraction is tested to see its cytotoxic effect on the fungus Pythium Ultimum. Showing signs of molecular activity, the fraction is then fractionated again until the alkaloids have been isolated enough from other compounds. With its final separation, the molecule’s mass is recorded and its molecular structure is examined. With this research, I wish to help more students explore a career in chemistry and hopefully, one of them will improve upon my research and use it as a stepping stone for his or her future experiments. With a year of high school remaining, I am fortunate that Project SEED has supported my curiosity to explore more of my field of major and further my education outside of school, which will help me fulfill my goal of becoming a pharmacist.”

Fosbinder Scholar: Alexis Parks, Coconino High School, Flagstaff, Ariz.
Mentor: Jani Ingram
SEED Institution: Northern Arizona University

“Project SEED furthered my knowledge of chemistry, more specifically analytical chemistry, beyond a point that I thought possible. My research project involved looking at radioactive metal levels on the Navajo Reservation and Colorado Plateau in order to determine if the amount of metal present was detrimental to the health in the surrounding Navajo community. The radioactive metals were mined by using open-pit mining techniques. Layers of top soil were removed in order to access the metal. In an effort to restore the land the government added a layer to the top soil after the mining was finished. In spite of the new layer of soil, the metal is still much closer to the surface than it used to be. Sheep graze on this land and ingest trace amounts of the radioactive metal. This could have major repercussions for the Navajo people because sheep is a major food source on the Reservation. The toxic trace metals may also be the cause of the elevated risk of cancer in the Navajo community. We collected our data to test the hypothesis by acidifying samples of sheep soft tissue and bones, plants, and water from various areas of the Reservation with Hydrofluoric Acid, Nitric Acid, and Boric Acid. We then ran the samples through an Inductively Coupled Plasma Mass Spectrometer (ICP-MS). My eight weeks in the Northern Arizona University (NAU) chemistry labs began with a three-day training period on lab safety and legal protocol with the other summer students. I then moved on to in-lab training with my group. I was taught how to calibrate pipettes, how to properly pipette solutions, and how to weigh exact amounts of dry materials. I started actual lab work by weighing out dried samples into 10 mL crucibles and 4 mL glass vials so that we could dry ash them and then prepare them for further testing. I also weighed out exact amounts (0.7700 g) of boric acid so we could finish preparing samples that were ashed before I joined the program. On Tuesday, 5 August we presented our preliminary findings to the families that live in the affected areas, and to other people interested in our work. We plan to present our findings to the Navajo community as a whole once we have definitive results. If the toxic metal amounts prove to be above background levels, we hope to find ways to lower them to safe levels, in an attempt to prevent future health risks.

Project SEED influenced my education and career plan by opening my eyes to the possibilities of lab work. I grew professionally during the project, as I learned a great deal about ethics in science, how to work in a lab environment, the importance of meeting deadlines, and the importance of thorough data collection. The project helped me understand that I have potential as a chemist. I am planning on pursuing an analytical chemistry degree and finding a career in the chemistry field. Project SEED completely changed my plans for my future, and I am thankful for that.”
Bader Scholar: **Nina Raymundo**, Lawrence North High School, Indianapolis, Ind.
Mentor: Maria Teresa Rizzo
SEED Institution: Methodist Research Institute, Indianapolis, Ind.

“The summer before my senior year, I was fortunate enough to be chosen as one of the few Project SEED interns. For a duration of 8 weeks, I worked under Dr. Maria Teresa Rizzo at The Methodist Research Institute. I was given the task to find a novel treatment for Glioblastoma Multiforme by targeting the enzyme mPGES-1. During my stint at the lab, I believe that I was able to grow as person. The first few weeks were highly stressful and I felt out of place but with the help of my mentor and my fellow Project SEED interns, I was able to get through. Not only was I able to learn about the technical about being in a lab such as how to perform a Western blot or how lyse cells, but I was able to explore the aspect that involved critical thinking and troubleshooting. All in all, my experience has allowed me to further delve into my interest with science. Through Project SEED, I have realized how much I enjoyed working in the field of research which has inspired me to continue on this path in the future. As a freshman at IU Bloomington this upcoming fall, I hope to participate in undergraduate research to continue on expanding knowledge.”

Bader Scholar: **Jamarii Robinson**, Mississippi School for Mathematics and Science, Columbus
Mentor: Douglas Masterson
SEED Institution: University of Southern Mississippi

“Project SEED is an outstanding life-changing experience. My words alone cannot express how great of a program it is. For the past two summers, I have worked in an organic lab at the University of Southern Mississippi (USM) led by Dr. Douglas Masterson. The wonderful experience that is Project SEED allowed me to learn from intelligent students and teachers, gain important comprehensions of chemistry, and undergo a preview of my future career. Project SEED allows students to meet with professors and their students to learn about chemistry in a laboratory setting. As an adolescent from a low-income family, I usually do not get many opportunities to work with distinguished individuals. However, thanks to Project SEED, I have become familiar with many scientists at USM’s Chemistry Department. I have met Hari Kotapati, a graduate student who taught me both the basics of Organic Chemistry and college life. I also received the pleasure of working with Dr. Douglas Masterson. He helped me realize that while intelligent, chemists love to joke around and have fun. Due to Project SEED, I have met with many other students and faculty of USM’s Chemistry Department, each passing on their knowledge of chemistry. Through Project SEED, I was taught some of the essential concepts of organic chemistry. Scientific names of compounds consisting of up to thirty atoms were one of the first things I learned. The specific details of how to distinguish atoms based on position and bond numbers were also introduced to me. Before Project SEED, I was confused on how scientists were able to synthesize long compounds consisting of various elements. Hari and Dr. Masterson showed me how chemists could take a small compound and add several chains and substituents to create entirely new compounds. My summers in Project SEED are some of the best learning experiences I have underwent. While I participated in Project SEED, I learned not only the concepts of chemistry but also, how those concepts are used in the laboratory. The chemists at USM demonstrated different types of reactions. I had the opportunity to participate in PLE (Pig Liver Esterase), hydration, and dehydration reactions. Hari also presented how to use apparatuses, clamps, and tubes to suspend beakers and set up experiments. I was also taught new methods of measuring and pouring chemicals. With these procedures of optimal chemical distribution, I have helped students at my own school. I plan to use these valuable techniques in future experiments. **Project SEED is an extraordinary experience. Through it, I was able to meet chemists who taught me both the abstract and concrete concepts of chemistry. This knowledge has already proven its worth in my chemistry classes where their teachings helped me get high grades on quizzes and other assignments. Thanks to the scientists, teachers, and friends I have met though Project SEED, I was finally able to choose a focus and decide that chemistry would be part of my future career.”
Project SEED was a great experience! It introduced me to my intended major in biochemistry, and taught me a lot about college and my future post-graduate education. I learned a great deal about laboratory procedure, as well, and gained experience which will help me as I continue my education.

Kristen Stucki, Idaho
Summer II

It was a great experience. I practiced what I learned in school and learned new thing as well. The tests I conducted were very interesting and showed me how important following steps and being organized is. My mentor also help me understand why we were conducting certain test and how the test worked. I would do this again Even if they didn’t pay me.

Valdemar Roman, Calif.
Summer I

Project seed has helped me to become more responsible. I have learned so much more about chemistry during my first year in project seed. Since attending seed I have found chemistry more interesting than before.

Jose Miguel Perez, N.J.
Summer I

This summer was a learning experience for me. It showed me that science is everywhere. And it gave me an opportunity to see what it is that you actually do in college.

Adriyanna Jones, Mich.
Summer I

Project SEED has not only been informational, but fun and helpful in the development of my college and academic career!

Scarlett Scarberry, WV
Summer I

Project SEED was truly one of the most enriching learning experiences I have been able to take part in. Before this internship, I had never visited a laboratory before or even used basic instruments such as microscopes and pipettes. I feel much more prepared to pursue a career in a science-related field than I did before. I am very grateful towards the ACS & UPR-RP for granting me this opportunity.

Graciela Gautier, PR
Summer I

I came into Project SEED hoping to finally decide my final major to study in college or the career I want to pursue in life. However, Project SEED actually made my decision more difficult! Because of Project SEED, I discovered new branches of science that I never knew existed. Thus, my decision has grown even more difficult, because I have discovered new sciences that I love.

Erica Truong, Ohio
Summer II

This program has helped prepared me for not only college, but also my Senior year of high school. I am very grateful to this program, as well as to all that I learned while in it.

Courtney Christensen, UT
Summer I

Project Seed was great! I recommend it to all students who are interested in chemistry.

Selena Tran-Jurado, N. Mex.
Summer II
Students Speaking from the Lab

I had a lot of fun working on the SEED Project and while I’m not completely certain yet that I’d go into a chemistry major, the experience I had sparked my interest more to where I would definitely be willing to work more with chemists to help with their projects to continue learning more.

**Taylor Bergan, AK**  
**Summer I**

Project SEED was amazing and I learned many new things. I’m very happy that I was able to experience what it’s like to work in a real chemistry lab all summer!

**Eboni Bell, Calif.**  
**Summer I**

The SEED program gave me an amazing opportunity to expand my knowledge. I would suggest that for all high school students who I know. I learned a lot of organic chemistry, hands on a real lab. Anyone who likes chemistry should join this program.

**Kieu Ho, Minn.**  
**Summer II**

Overall I had an amazing time at this program. The environment was so welcoming and friendly. Everyone was very helpful and the program was very flexible. Also there were a lot of options for laboratory selection which I really liked. Labs ranged from all sorts of chemistry. This program was able to allow me and the rest of the SEED students to conduct real, graduate-level work in a fun way.

**Daniel Leung, Calif.**  
**Summer I**

It was a helpful program and helped me decide what I want to study.

**Kevin Seda, CT**  
**Summer I**

Project SEED was an excellent opportunity to experience scientific research and its real-life applications. It taught many valuable lessons; despite common misconceptions, science is all about networking! Project SEED helped me determine my major for college. I would definitely participate in the program again.

**Meliha Grbic, Idaho**  
**Summer I**

Project SEED offered me an amazing opportunity to learn and grow as a scientist. The effect it had on me will not only help throughout college but also help me in the future. I loved the opportunity to work in a lab preforming real research and I can’t wait to recommend the program to everyone at my school who’s interested in science.

**Crystal Vejar, UT**  
**Summer I**

Project Seed was a great experience. I was able to do fundamental research that taught me not only how to conduct professional experiments but also helped me understand the level of responsibility needed in the laboratory.

**Daem Celestin, Mass.**  
**Summer I**

Project SEED is an awesome opportunity for students that are at an economic disadvantage. It definitely helped me realize how much I love science, more specifically chemistry. I had a lot of fun and learned a lot. This is definitely a summer I would remember.

**Kevin Huang, VT**  
**Summer I**

Project SEED was an amazing experience and I wish all students could have that experience before they go off to college.

**Jonathan Jironvil, Mass.**  
**Summer II**
Project SEED students from Central New York, Indiana, New York, Northeastern, North Jersey, and Trenton Local Sections presented their Project SEED research projects at the Sci-Mix poster session at the 250th ACS Fall National Meeting in Boston, Mass.

Central New York Local Section:  Coordinator, Sally Mitchell
Jackson Hernandez  Revised Synthesis of 2-(Trimethylsilyl)methyl-2-propen-1-01

Indiana Local Section:  Coordinator, Elmer Sanders
Vishaal Mali  Development of In Vitro Protein Footprinting

New York Local Section:  Coordinator, Nadia Makar
Jessica Alvitres  Induction of Epithelial-to-Mesenchymal Transition (EMT) in Dormant Breast Cancer Micrometastases By Inflammatory Cytokines Leading to Reactivation of Cancer Cells
Sofia Dominguez  Fabrication and Characterization of Graphene and MoS2 Heterostructures
Isadora Faris  Factors Affecting the Disintegration Rate of Polymer Films
Josue Sanchez  Preparing Murchison Samples for \(^{40}\text{Ar/}^{39}\text{Ar}\) Dating

Northeastern Local Section:  Coordinator, Cheryl Schnitzer
Jessica Antoine  The Synthesis and Characterization of a Tetrahydroxylated Pyrrolizidine
Daem Celestin  The Absorption of Thioethers on Au(111)
Jonathan Jironvir  The Synthesis of Polyhydroxylated Pyrrolidine from L-glucose and D-altrose Derivatives
Cesar Romero  The Absorption of Thioethers on Au(111) Using Scanning Tunneling Microscope

North Jersey Local Section:  Coordinator, Susan Fahrenholtz
Badjessa Bahoumda  Comparison of Air and Helium as Carrier Gas using an Ionic Liquid Column
Batch Clerizier  Peptide Synthesis in the Laboratory
Vivian Igwagu  The Synthesis of Glucals for Use in Drugs
Danielson Joseph  Study of Selectivity of Alkanes on Ionic Liquid Columns
Justin Quezada  Development of a Dispersive Microextraction Method for Environmental Monitoring
Johanna Riera  Liposomes as Drug-Carriers to Target Cancer Cells
Charles Ta  Regulating the Balance of Neural and Chemical Activity in the Brain through Localization of CAMK in Inhibitory Synapses
Nicole Taylor  Holey Expanded Graphite and its Electrocatalytical Application

Trenton Local Section:  Coordinator, Danielle Jacobs
Mideum Abraham Park  Investigations into the Green Aza-Conjugate Addition of Sulfonamides to 2-Vinylpyridine & its Derivatives
Haniyyah Sardar  Development of New Biocatalytic Strategies and a Biochemistry Teaching Lab
2015 Student Survey Results

The survey is designed to assess the success of the program. The results of the survey provide information on the background of the students, their educational aspirations, and their assessment about Project SEED. This information is useful in determining whether Project SEED is serving its target population and if it is achieving its goals. Of the 423 students in the program, 406 students responded.

<table>
<thead>
<tr>
<th>Student Gender</th>
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<th>%</th>
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<td>Male</td>
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<tr>
<td>Female</td>
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<td>102</td>
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<th>Family Income Level</th>
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<td>18%</td>
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<td>102</td>
<td>100%</td>
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<tr>
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<tr>
<td>Delaware</td>
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</tr>
<tr>
<td>District of Columbia</td>
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<td>2</td>
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<tr>
<td>Florida</td>
<td>6</td>
<td>2</td>
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<tr>
<td>Georgia</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Hawaii</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Idaho</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Illinois</td>
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<td>Indiana</td>
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<td>10</td>
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<tr>
<td>Iowa</td>
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<tr>
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<td>1</td>
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<td>1</td>
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<td>Puerto Rico</td>
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<td>South Carolina</td>
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<td>Vermont</td>
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<td>1</td>
</tr>
<tr>
<td>West Virginia</td>
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<tr>
<td>Wisconsin</td>
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</tr>
<tr>
<td>TOTAL</td>
<td>304</td>
<td>102</td>
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</table>
## 2015 Student Survey Results

### How much education Do you expect to complete

<table>
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<tr>
<th></th>
<th>Summer I</th>
<th>Summer II</th>
<th>Total %</th>
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</thead>
<tbody>
<tr>
<td>High School</td>
<td>78</td>
<td>16</td>
<td>23.2%</td>
</tr>
<tr>
<td>Vocational, Trade</td>
<td>0</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Some College</td>
<td>1</td>
<td>0</td>
<td>0.2%</td>
</tr>
<tr>
<td>2-year College</td>
<td>2</td>
<td>0</td>
<td>0.5%</td>
</tr>
<tr>
<td>4-year College</td>
<td>78</td>
<td>17</td>
<td>23.4%</td>
</tr>
<tr>
<td>Graduate/Professional School</td>
<td>145</td>
<td>68</td>
<td>52.5%</td>
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</table>

### Student Research Sites

<table>
<thead>
<tr>
<th></th>
<th>Summer I</th>
<th>Summer II</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Laboratory</td>
<td>183</td>
<td>74</td>
<td>63%</td>
</tr>
<tr>
<td>Government Laboratory</td>
<td>17</td>
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<td>5%</td>
</tr>
<tr>
<td>Industrial Laboratory</td>
<td>82</td>
<td>18</td>
<td>25%</td>
</tr>
<tr>
<td>Medical Laboratory</td>
<td>22</td>
<td>7</td>
<td>7%</td>
</tr>
</tbody>
</table>

### Students Agreed that Project SEED Helped:

<table>
<thead>
<tr>
<th></th>
<th>Summer I</th>
<th>Summer II</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop Skills and abilities</td>
<td>295</td>
<td>99</td>
<td>97%</td>
</tr>
<tr>
<td>Develop self-confidence</td>
<td>279</td>
<td>90</td>
<td>91%</td>
</tr>
<tr>
<td>Develop responsibility</td>
<td>287</td>
<td>94</td>
<td>94%</td>
</tr>
<tr>
<td>Understand the ethical behavior of scientists</td>
<td>210</td>
<td>95</td>
<td>75%</td>
</tr>
<tr>
<td>Develop better study habits</td>
<td>269</td>
<td>66</td>
<td>83%</td>
</tr>
<tr>
<td>Learn what advance study is like</td>
<td>195</td>
<td>94</td>
<td>71%</td>
</tr>
<tr>
<td>Decide to continue my education after high school</td>
<td>267</td>
<td>94</td>
<td>89%</td>
</tr>
<tr>
<td>Choose a college major</td>
<td>281</td>
<td>92</td>
<td>92%</td>
</tr>
<tr>
<td>Decide to pursue a career in science</td>
<td>192</td>
<td>67</td>
<td>64%</td>
</tr>
<tr>
<td>Develop greater interest in scientific/technical areas</td>
<td>246</td>
<td>84</td>
<td>81%</td>
</tr>
</tbody>
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### College Majors

<table>
<thead>
<tr>
<th></th>
<th>Summer I First Choice</th>
<th>Summer II First Choice</th>
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</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Architecture</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Astronomy</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Biology &amp; Life Sciences</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>Business &amp; Commerce</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Chemistry</td>
<td>23%</td>
<td>28%</td>
</tr>
<tr>
<td>Communications</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Computer Sciences</td>
<td>5%</td>
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<tr>
<td>Earth Sciences</td>
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<tr>
<td>Education</td>
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<tr>
<td>Engineering</td>
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<tr>
<td>Foreign Languages</td>
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<tr>
<td>Health Professions</td>
<td>13%</td>
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<tr>
<td>Home Economics</td>
<td>0%</td>
<td>0%</td>
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<tr>
<td>Language &amp; Literature</td>
<td>0%</td>
<td>0%</td>
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<tr>
<td>Library Science</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1%</td>
<td>2%</td>
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<tr>
<td>Military Sciences</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Pharmacy Sciences</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Philosophy</td>
<td>2%</td>
<td>2%</td>
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