

# University of Louisville Cancer Education Program

UNIVERSITY OF  
**LOUISVILLE**

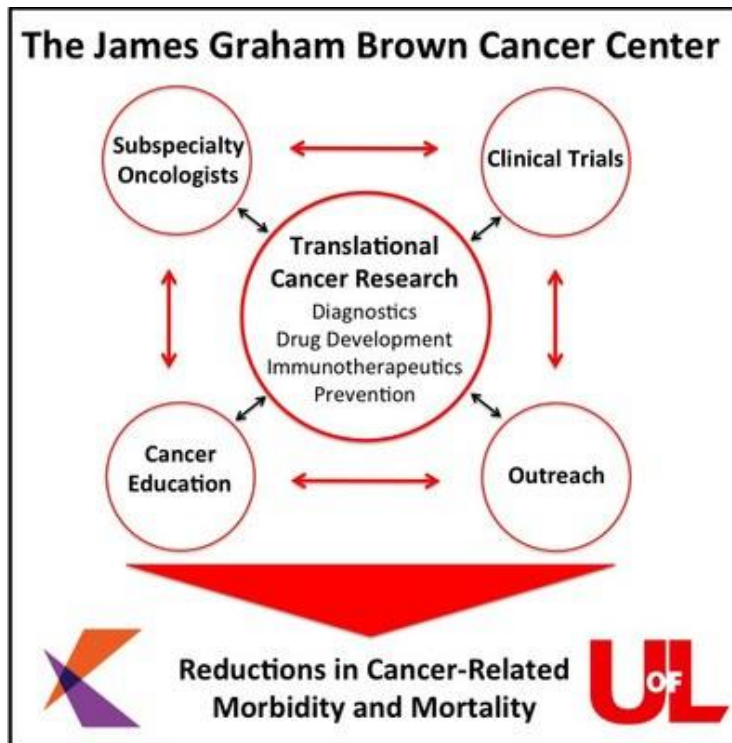
UNIVERSITY of LOUISVILLE



[Funded by National Cancer Institute grant R25-CA134283.](#)

# Cancer Education Program Objectives

- The long-term objective of the University of Louisville Cancer Education Program is to recruit, educate and motivate outstanding undergraduate and professional students to pursue further training and future careers in cancer research.





**University of Louisville Cancer Education Program 2015 Class**

**Program Overview Video Link: <http://video.louisville.edu/vod/tvprod/QC/Interviews2.mp4>**

# Institutions from which NCI Cancer Education Program Participants Have been Recruited Years 1-5

- Auburn University
- Campbellsville University
- Cheyney University of Pennsylvania
- Clemson University
- Cornell University
- Drexel University
- Duke University
- Earlham College
- Emory University
- Goshen College
- Howard University
- Indiana University
- Massachusetts Institute of Technology
- Michigan State University
- Middle Tennessee State University
- Mississippi State University
- Morehead State University
- Roosevelt University
- Spelman College
- St Louis University
- SUNY-Binghamton
- University of Alabama
- University of Chicago
- University of Cincinnati
- University of Houston
- University of Louisiana-Monroe
- University of Louisville
- University of Kentucky
- University of Notre Dame
- Washington University
- Western Kentucky University
- Wheaton College
- Yale University

# Institutions Where NCI Cancer Education Program Participants Continue Cancer Research & Training

- PhD Programs
  - Johns Hopkins University
  - University of Louisville
  - University of South Carolina
- MD Programs
  - Columbia University
  - Drexel University
  - James H. Quillen College of Medicine
  - Johns Hopkins University
  - St. Louis University
  - University of Louisville
  - University of Kentucky
- MD/PhD Programs
  - University of Louisville
  - University of Kentucky
- PharmD Programs
  - Lake Erie College of Osteopathic Medicine
  - University of Kentucky
- Masters of Public Health Programs
  - University of Louisville
- Masters of Science in Social Work Programs
  - University of Louisville
- Master of Science
  - Purdue University

# Professional Development and Enrichment

## **Professional development and training activities**

- Research ethics and integrity training/Responsible conduct of research
- Human subjects/HIPPA training
- Animal care and use training
- Lab safety, hazardous waste, and blood borne pathogen training
- Distinction in Research Program
- Creating an individualized career development plan
- How to write and submit a manuscript
- How to prepare award winning research abstracts
- How to prepare and present award winning research posters
- How to write a personal statement for application to professional or graduate school
- MD/PhD programs

## **Cancer research seminars**

- Research presentations by former NCI Cancer Education Program participants
- James Graham Brown Cancer Center Seminar Series
- Colloquia on Cancer Biology & Therapeutics Seminar Series
- Special colloquia seminar on the career path of academic faculty members at the James Graham Brown Cancer Center
- Departmental seminars including graduate student seminars

# Navigating Careers in Cancer Research

Trainees have an opportunity to network with past participants and/or faculty and learn survival skills to pursue cancer research careers in:

- Careers in academia
- Careers in government
- Careers in public health
- Careers in medicine
- Careers in community outreach & education
- PhD and combined MD/PhD training programs

We also have special topics including "Women in Science" and "professional training programs".

# Navigating Careers in Cancer Research



NCI Cancer Education Program graduates and current MD/PhD students Douglas Saforo and James Bradley discuss MD/PhD career paths with 2015 NCI Cancer Education Program undergraduates during roundtable navigation of cancer careers.

Video link: <http://video.louisville.edu/vod/tvprod/QC/RoundTable2.mp4>



[Mentoring by faculty of the James Graham Brown Cancer Center](#)

NCI Cancer Education Program undergraduate Thomas Packer Jr. learning research procedures from Dr. La Creis Kidd, program co-director and faculty mentor.

Video link:

<http://video.louisville.edu/vod/tvprod/QC/Lab2.mp4>



# Participant Mentoring



NCI Cancer Education Program undergraduate student Maggie Chang (left), works along side Samantha Carlisle (right), NCI Cancer Education Program graduate and current PhD candidate in cancer research.



NCI Cancer Education Program undergraduate Karen Udoh (front) discusses her research results with Douglas Saforo (back), NCI Cancer Education Program graduate and current MD/PhD student.

# Participant Mentoring



NCI Cancer Education Program undergraduate student Hailey Griffey conducting research project in the laboratory of Dr. Brian Ceresa.

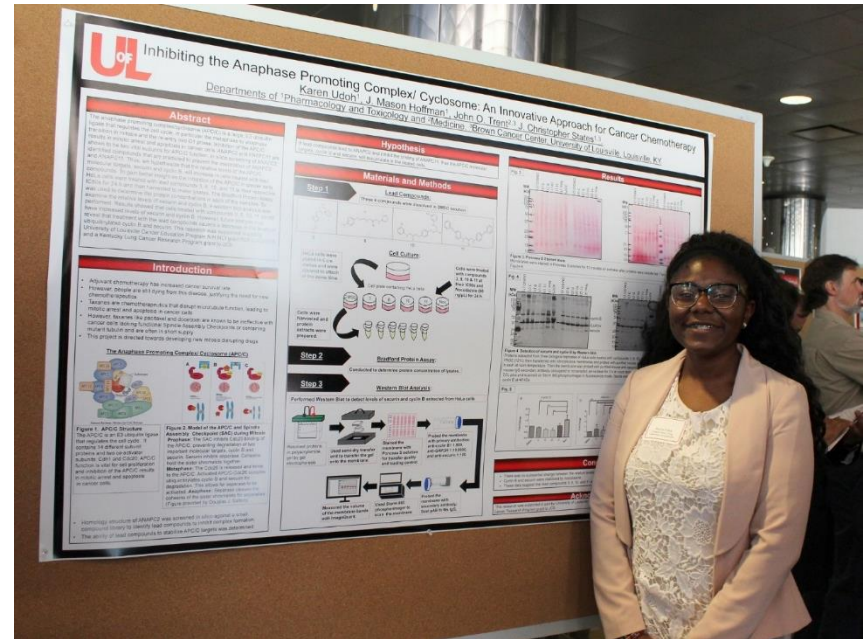


NCI Cancer Education Program graduate Nicole Jackson continuing her cancer research project as a PhD candidate in pharmacology & toxicology in the laboratory of Dr. Brian Ceresa. Nicole received a prestigious SREB fellowship for her graduate studies.

# Poster Presentations of Cancer Research



Maggie Chang, Cancer Education Program undergraduate discusses her research project results with Douglas Saforo, Cancer Education Program graduate and current MD/PhD student.



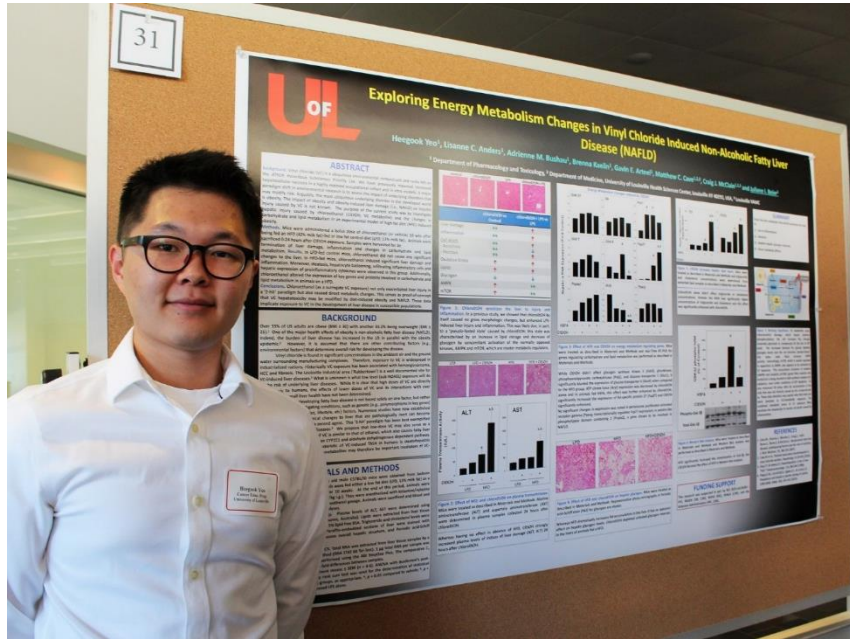
NCI Cancer Education Program undergraduate student Karen Udoh.

Video link for poster presentations: <http://video.louisville.edu/vod/tvprod/QC/PosterExhibit2.mp4>

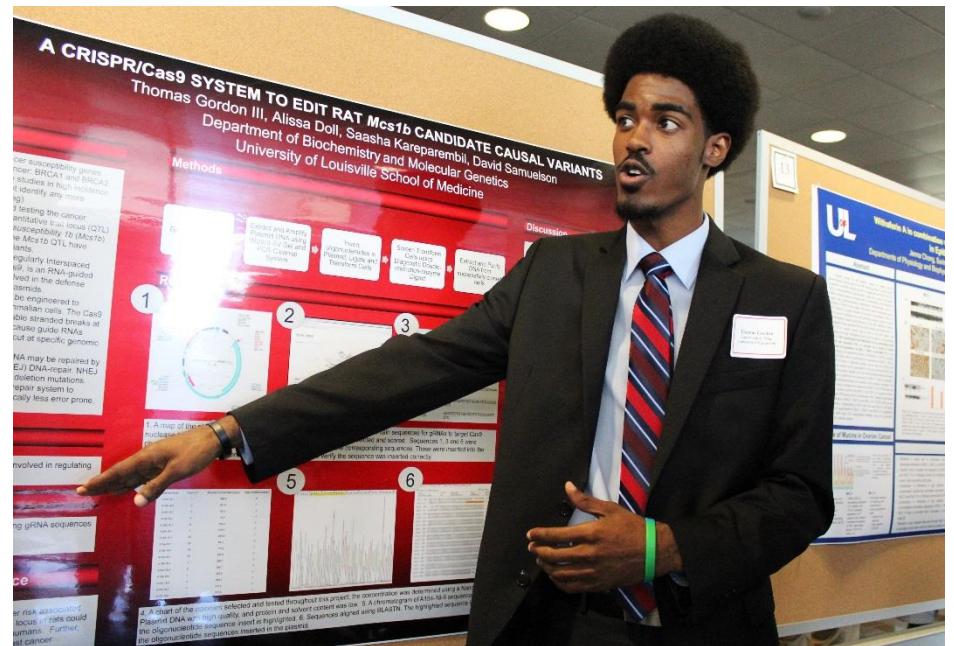
Hyperlink for all research posters:

<http://louisville.edu/medicine/departments/pharmacology/research/nci-r25-cancer-education/trainee-scientific-research-project-posters-by-year>

# Poster Presentations of Cancer Research

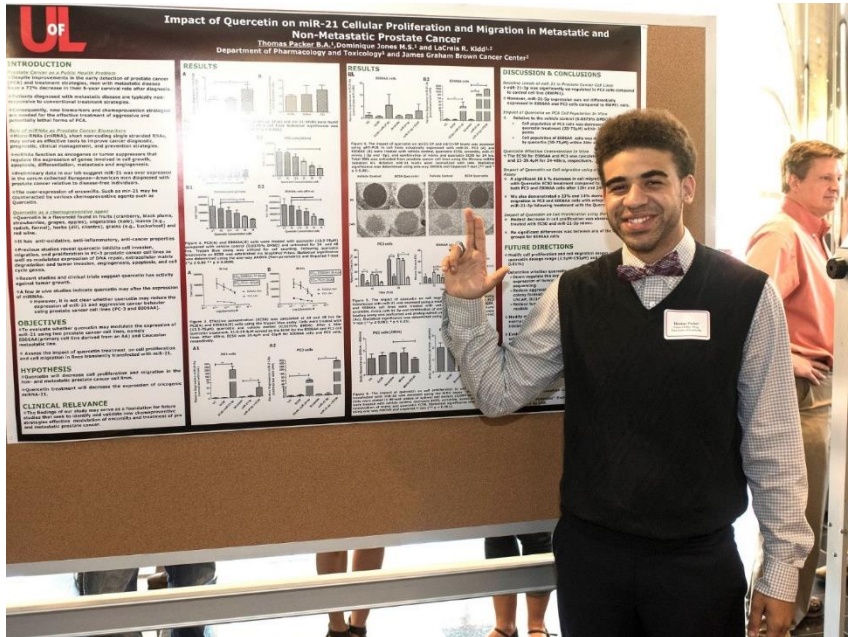


NCI Cancer Education Program undergraduate student Heegook Yeo.



NCI Cancer Education Program undergraduate student Thomas Gordon III.

# Poster Presentations of Cancer Research

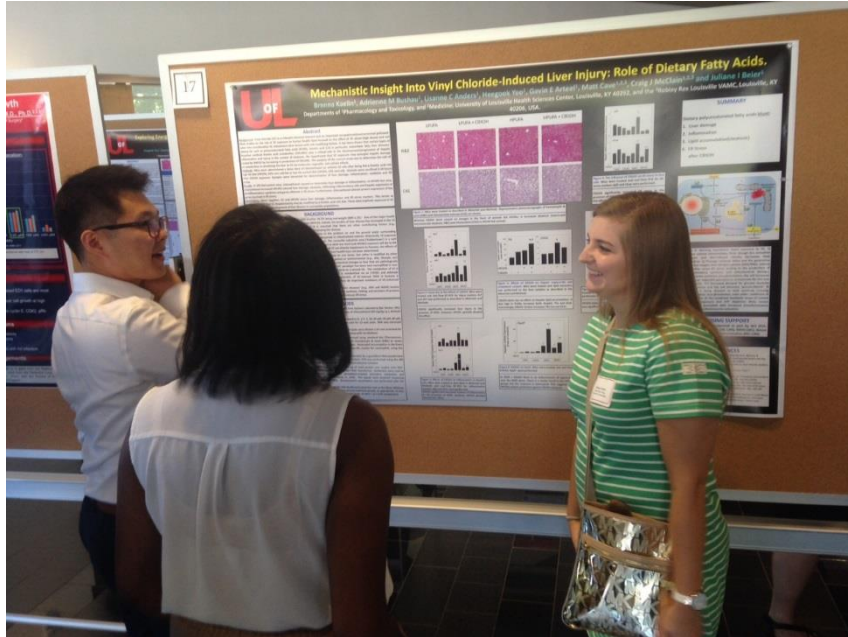


NCI Cancer Education Program undergraduate student Thomas Packer Jr.

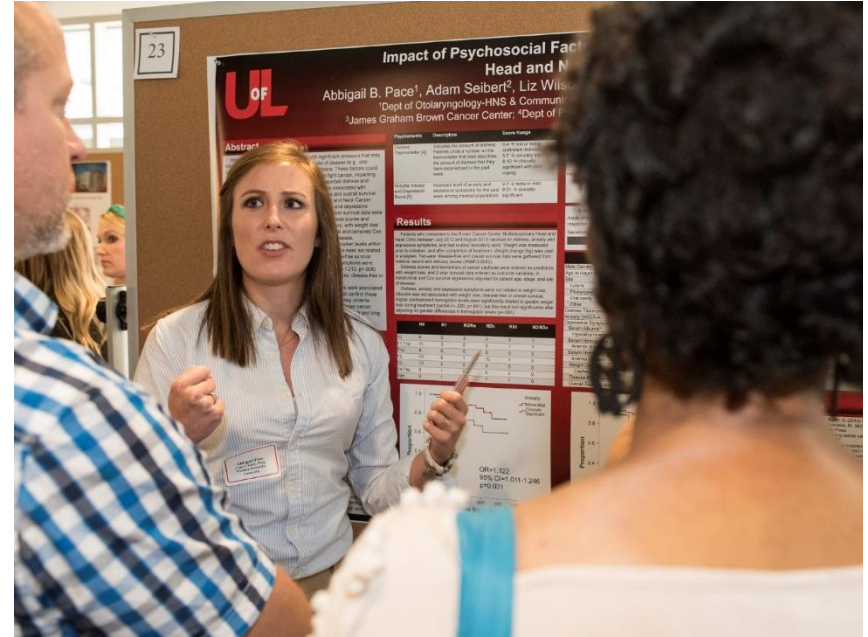


NCI Cancer Education Program undergraduate student Hailey Griffey.

# Poster Presentations of Cancer Research

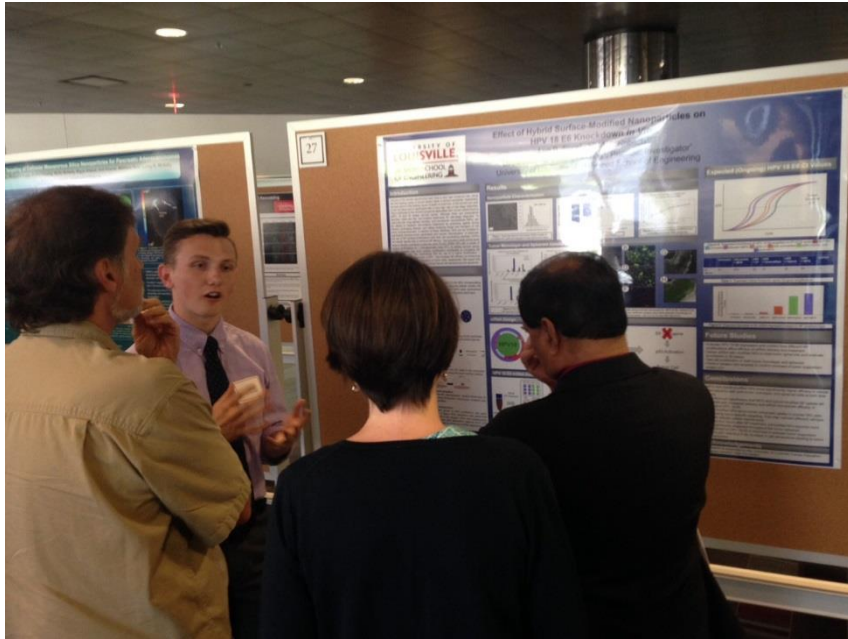


NCI Cancer Education Program undergraduate student Brenna Kaelin.

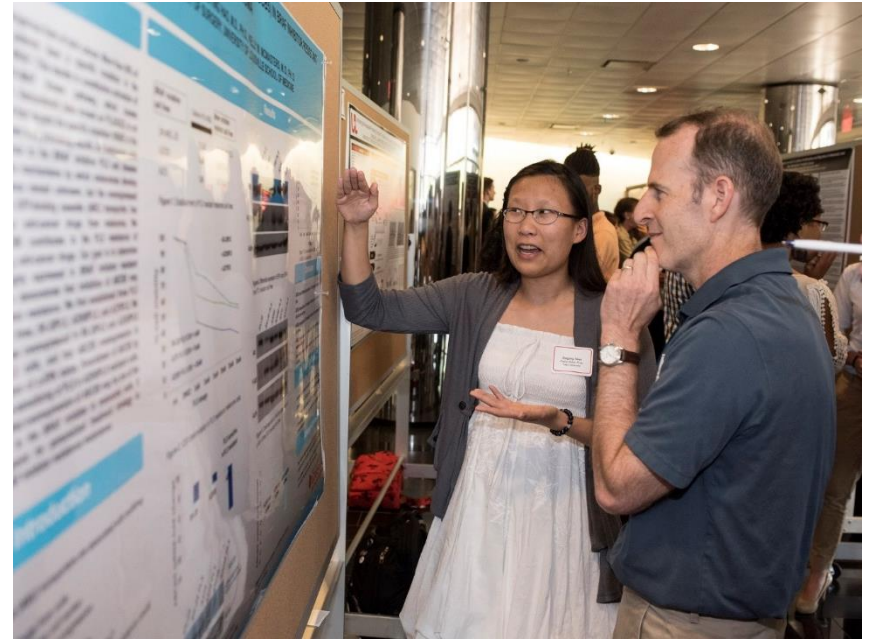


NCI Cancer Education Program undergraduate student Abbigail Pace.

# Poster Presentations of Cancer Research



NCI Cancer Education Program  
undergraduate student Lee Sims.



NCI Cancer Education Program  
undergraduate student Jingjing Xiao.



# Student Participant Presentations of Research Projects



NCI Cancer Education Program undergraduate student Thomas Packer Jr. presents his research to the Cancer Education Program class during professional development meetings.

Video link: <http://video.louisville.edu/vod/tvprod/QC/Classroom2.mp4>

# Research Poster Awards



Dr. David Hein, NCI Cancer Education Program Director (right) and Dr. Pam Feldhoff, Associate Vice President for Research (left) present Norbert J. Burzynski First Place Research Presentation awards to Dillon Pender (Professional student category at left) and Lee Sims (Undergraduate student category at right). [Link to all research awards](#)

# Student Presentations at National Scientific Meetings

Participants have presented their research at numerous national and international scientific venues including:

- Academic Surgical Congress
- American Association for Cancer Research
- Atlantic Coast Conference Meeting of the Minds
- Biomedical Engineering Society
- Breast Cancer Research Symposium
- International Cannabinoid Research Society Symposium
- International Endocrine Society
- Keystone Cancer Conference
- National Student American Institute of Chemical Engineers
- Society for the Advancement of Chicanos and Native Americans in Science
- Society of Toxicology

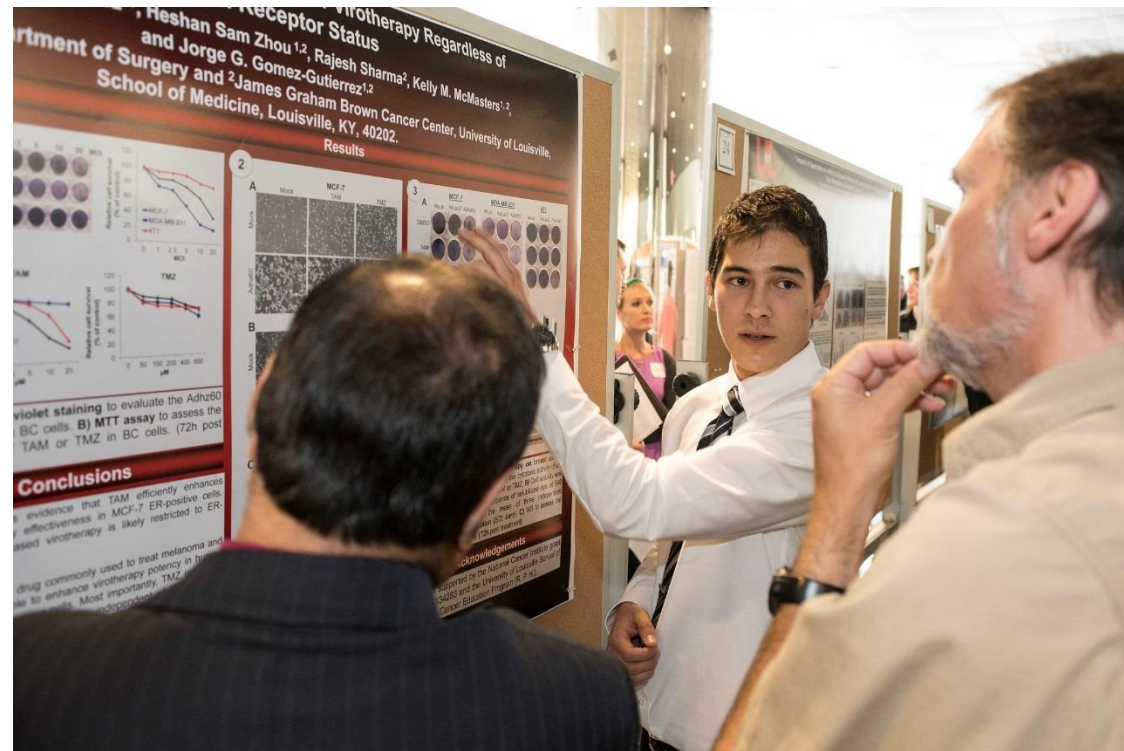
# Student Testimonials

“As a first-generation Latino college student, I want to continue to pursue my dream of earning an MD/PhD and contribute to the scientific community through research and discovery. ... I want to ameliorate the lives of other families who struggle with cancer.”

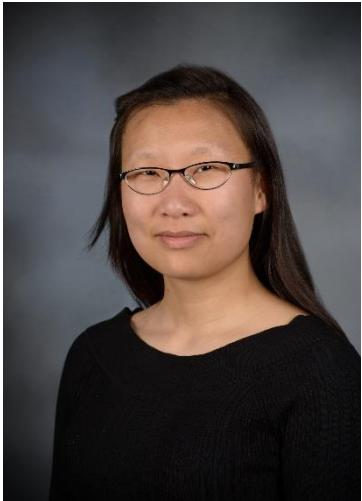
“I want to thank you again for providing me with such an enriching research experience this past summer --I have gained invaluable knowledge and established connections that I will continue to foster throughout my academic career. Recently, I applied to a national conference called the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Conference. I am pleased to inform you that my abstract was just accepted and I will be presenting my summer research project in Washington D.C.”

“Just as the physician works to heal patients, I plan to work in creating better treatments for combating cancer. After receiving a medical education, I plan to work at the James Graham Brown Cancer Center with the intention of advancing the health of the entire global community.”

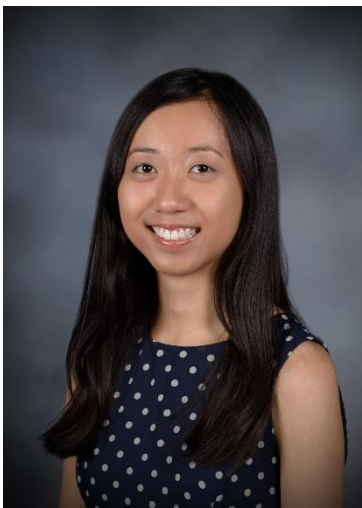
-- Rigoberto Perez-Hernandez, Cornell University  
2015 NCI Cancer Education Program undergraduate



# Student Testimonials



This summer, I've learned more about the cancer research career path in CEP than I could have ever learned in class. Exposure to real life experience and testimony helped me clarify my career goals exceptionally, more than I imagined. Thank you both for making this possible! Stay in touch,  
Jingjing Xiao, undergraduate participant from Yale University



I have had the most wonderful time ...with the NCI-R25 Program I have been exposed to the way real scientists discover new knowledge, gained a deeper appreciation of the scientific process, learned how to communicate results in an effective way, and most most most importantly walked away with a very positive experience and a passion for research. I also feel much more confident about my ability to conduct research. I am so glad I chose to spend my summer in the R25 Program. I made the right decision for sure!!  
Maggie Chang, undergraduate participant from University of Louisville

# Student Testimonials



I was accepted to The University of Michigan Medical School but I elected to attend The Johns Hopkins University School of Medicine. I am currently about to start my second year in the MD Program. My ultimate goals are to spend 2-3 days/week in the clinic and then spend the rest of the week teaching at a medical school/doing research on pharmacological agents that could potentially modulate the immune response to neoplastic cells. Similar approaches have worked in a host of experimental treatments that have been explored at The Hopkins Hospital. I am currently working on a project to identify the unique proteins that are expressed by Kupffer cells in the liver as a marker of inflammation (which is itself tied to a wide range of disease processes).  
Divine Anene, Cancer Education Program undergraduate from University of Louisville.



Thank you once again for the awesome opportunity to participate in this research experience. I presented the poster I presented at Research!Louisville at the National Student American Institute of Chemical Engineers (AIChE) conference this past November in Atlanta, GA. I placed second in the undergraduate poster competition in the Food, Pharma, and Biotechnology II division. I am currently a first year graduate research assistant at the University of South Carolina where I am pursuing a Ph.D in Chemical Engineering. Under the guidance of Dr. Michael Gower, my research focus is on using innovative immunoengineering techniques for the prevention and treatment of colon cancer.  
Kendall Huddleston, Cancer Education Program undergraduate from the University of Kentucky.

# Student Outcomes



2013 program participant Connor Kinslow from SUNY-Binghamton presented his research poster at the American Association for Cancer Research meetings in San Diego, CA. Connor continued the project he began in the NCI Cancer Education Program at UofL (patient-derived models of non-small cell lung cancer metabolism) at the University of Kentucky. During the summer of 2014, he interned in the Pediatric Oncology Education Program at St. Jude Children's Research Hospital. As of 2015 he is enrolled in the MD program at Columbia University.



2014 program participant Lindsey Wattley, a junior at Massachusetts Institute of Technology (MIT), is double majoring in biology and brain & cognitive sciences. Since graduating from the UofL Cancer Education Program she has completed research in the Griffith Lab at MIT investigating intestinal spheroids and micro-fluidics, and an internship at Mount Auburn Hospital in Cambridge MA in the radiation oncology department. Upon graduation from MIT in 2017, she plans to enter a MD/PhD program.

# Student Outcomes



Joshua Mitchell, an undergraduate student participant in 2012 who returned to the program in 2013 is now enrolled in the MD/PhD program at the University of Kentucky. Joshua has published results from his cancer research project in [Front Genet.2014; 5:237](#). PubMed Central PMCID: PMC4112935.

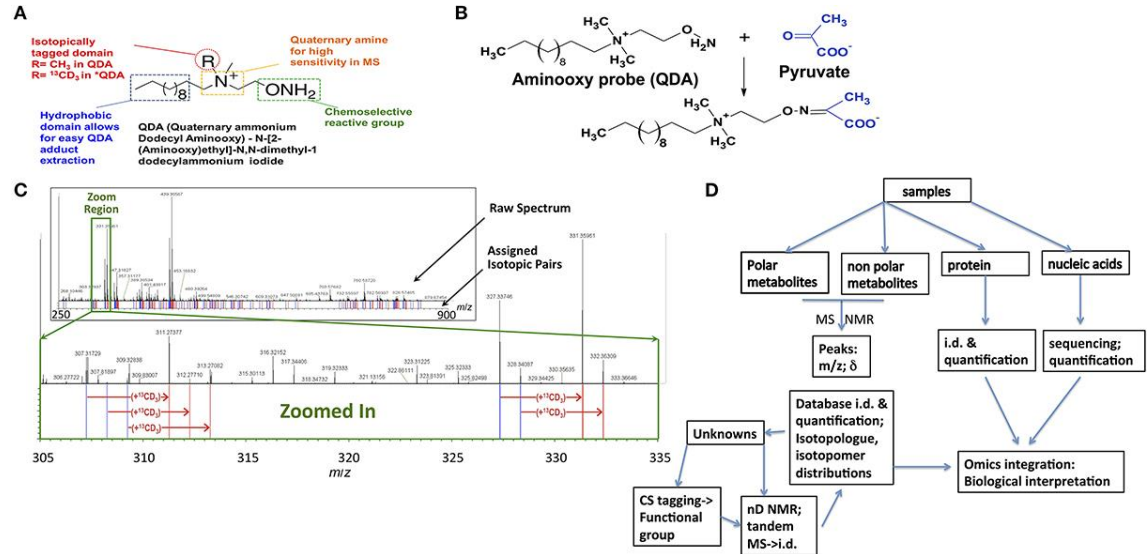
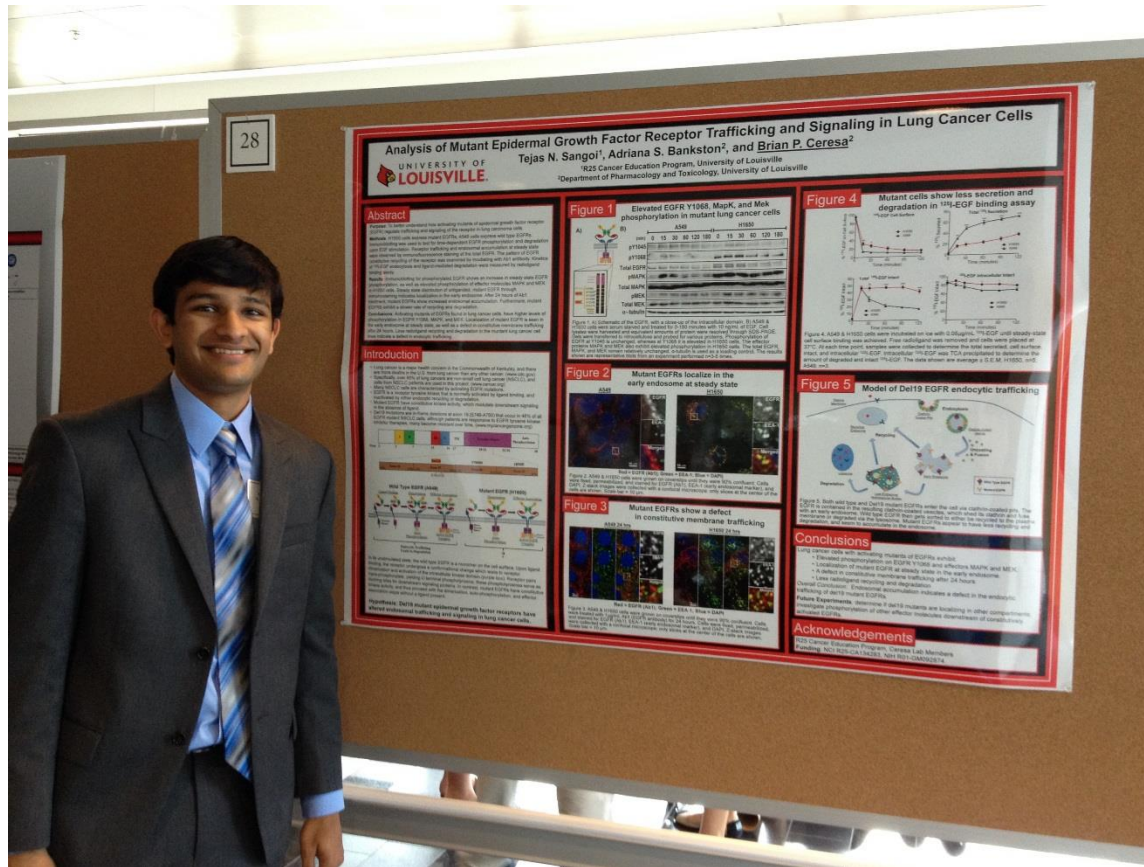


Figure 1 from Mitchell et al., [Front Genet 2014; 5: 237](#)

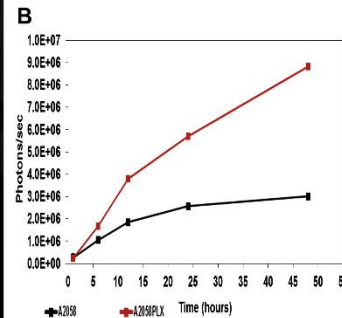
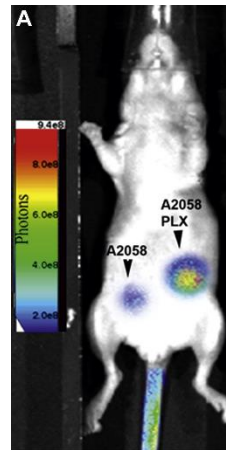
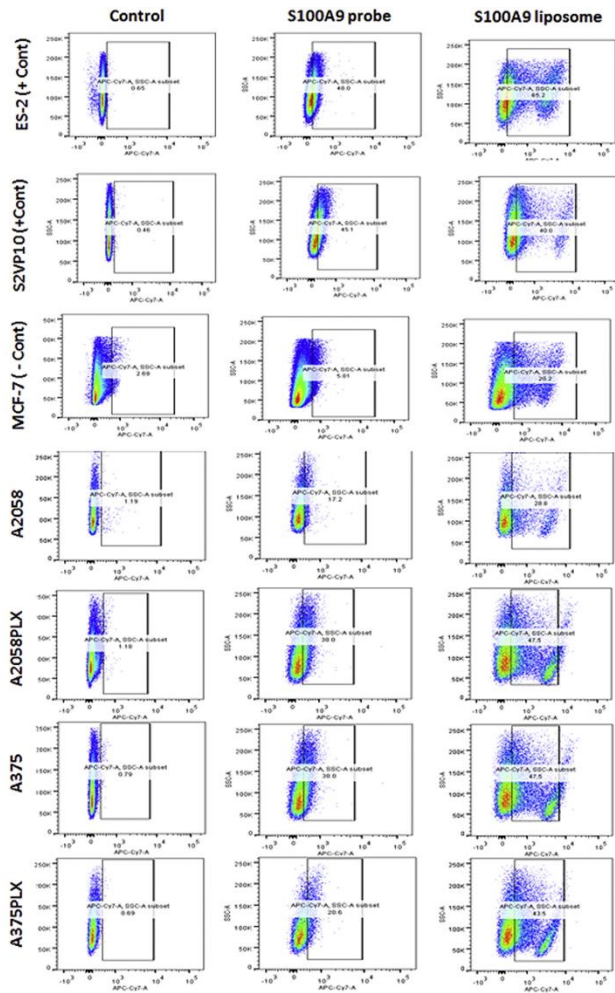


# Student Outcomes



Tejas Sangoi an undergraduate student participant from Saint Louis University was accepted into medical school at Saint Louis University School of Medicine where he is continuing cancer research with Dr. Thomas Cho in the Department of Biochemistry and Molecular Biology.

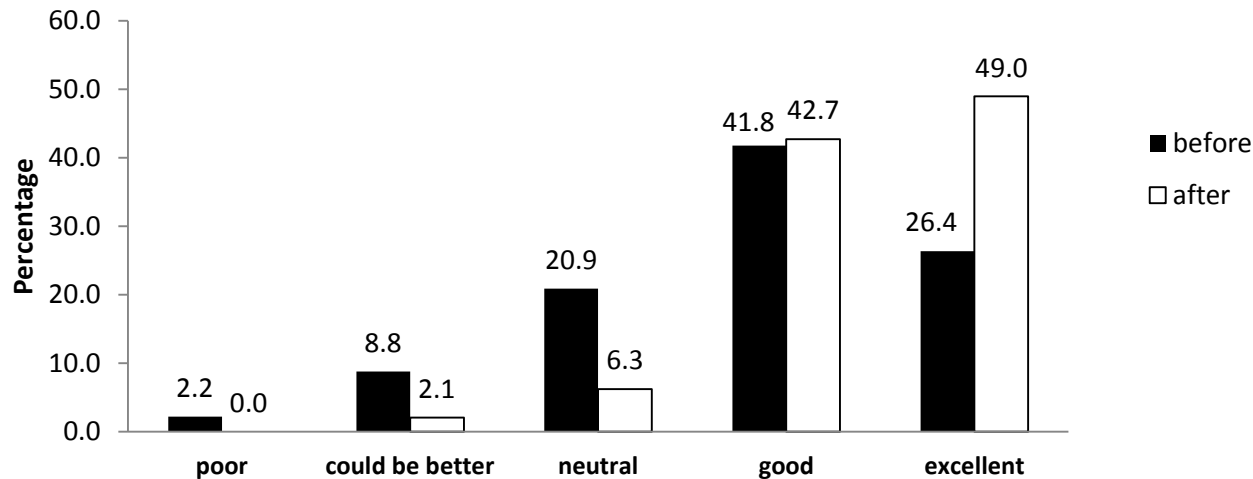
# Student Outcomes



Cancer Education Program students and mentors designed a novel drug delivery vehicle for treatment of metastatic melanoma that has developed resistance to the BRAF inhibitor vemurafenib. The research was published in the [Journal of Surgical Research 190, 2014, 111-118](#) (two figures shown). Two of the authors, including first author Matthew Zeiderman (above), are NCI Cancer Education Program graduates. Zeiderman is a UofL medical student continuing his cancer research in the Distinction in Research Program. Matt presented this work at the Ninth Annual Academic Surgical Congress in San Diego, CA. The other student author is Tess Dupre, a UofL Ph.D. candidate in pharmacology and toxicology. Dupre has received a travel award to present cancer research results on her PhD dissertation at the American Society of Nephrology meeting.

# Student Outcomes

## Improvement in cancer research interest of participants after completing the University of Louisville Cancer Education Program



A blinded electronic survey was used to assess participants' interest in cancer research before and after the University of Louisville Cancer Education Program. Evaluation scores of 1, 2, 3, 4, and 5 corresponded to qualitative values of "poor", "could be better"; "neutral", "good", and "excellent", respectively. Since the program began in 2012, there is a significant cumulative improvement in the level of interest in cancer research comparing participants' evaluation scores before and after the Cancer Education Program (Wilcoxon Signed Rank Test  $P < 0.0001$ ). The level of interest in cancer research improved, remained the same, or decreased among 46.5%, 45.4%, and 8.2% respectively. There was a nearly 2-fold increase in the proportion of trainees who rated their cancer research experience as excellent after the Cancer Education Program compared to baseline scores (chi-square  $P$ -value = 0.0015).



# NCI Cancer Education Program Progress Report

	<u>5 year goal</u>	<u>Progress at year 4</u>
Number of participants who complete the program	115	121 (156) <sup>a</sup>
Number of student participants who complete and present their research project	100	121 (156) <sup>a</sup>
Number of participants from underrepresented minority groups who complete the program	37	34 (53) <sup>b</sup>
Number of student participants who continue in cancer research and/or training	25	58
Number of medical students who pursue “Distinction in Research”	-	31 <sup>c</sup>
Number of female participants who complete the program	66	49 (69) <sup>d</sup>
Number of undergraduate student participants who have enrolled in MD/PhD programs	-	4
Number of undergraduate student participants who have enrolled in PhD graduate programs	-	14
Number of undergraduate student participants who have enrolled in health professional (MD, DMD, PharmD) programs	-	17
Number of undergraduate students participants who have enrolled in Master’s graduate programs	-	3 (MPH, MSSW,MS)

<sup>a</sup>An additional 35 students were accepted for the 2016 class. To date, 100% of students enrolled have completed the program and 100% have presented their research project. Thus the anticipated total through year 05 is 156.

<sup>b</sup>An additional 19 under-represented minority students were accepted for the 2016 class. Thus the anticipated total through year 05 is 53.

<sup>c</sup>An additional 8 medical student participants from the class of 2013 received a Distinction in Research Certificate with their MD awarded May 2016 yielding a two year total of 31.

<sup>d</sup>An additional 20 female students were accepted for the 2016 class. Thus the anticipated total through year 05 is 69.

# Participate in our dynamic NCI cancer education program!!!

Opportunity to interact with renowned cancer research faculty mentors

Receipt of a subsistence allowance (set by NCI)

Housing and parking accommodations

Interactions with graduate and professional students

Interactions with other summer research programs

Funds to present research at national meetings

For more information on the UofL NCI Cancer Education Program, including application instructions, student participants, faculty mentors, videos of program sessions and research project abstracts/posters, visit: <http://uofl.me/nci-r25>

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