Critical Bridge to Surgical Innovation: Professional Development, Mentorship & Research Training for Surgical Trainees

Ginny L. Bumgardner MD PhD
Professor of Surgery
December 18, 2015
Objectives

- Review the 2004 Surgery Blue Ribbon Committee Report & Directives
- Discuss the Evolution of the Professional Development Program in the OSU Department of Surgery
- Outcomes & Metrics of Success
- Initial Investment & Financial Sustainment
- Challenges
- New Directions
2004 Surgery Blue Ribbon Committee Report

American Surgical Association Blue Ribbon Committee Report on Surgical Education: 2004

Haile T. Debas, MD, Barbara L. Bass, MD, FACS, Murray F. Brennan, MD, FACS, Timothy C. Flynn, MD, FACS, J. Roland Folse, MD, FACS, Julie A. Freischlag, MD, FACS, Paul Friedmann, MD, FACS, Lazar J. Greenfield, MD, FACS, R. Scott Jones, MD, FACS, Frank R. Lewis, Jr., MD, FACS, Mark A. Malangoni, MD, FACS, Carlos A. Pellegrini, MD, FACS, Eric A. Rose, MD, FACS, Ajit K. Sachdeva, MD, FRCSC, FACS, George F. Sheldon, MD, FACS, Patricia L. Turner, MD, Andrew L. Warshaw, MD, FACS, Richard E. Welling, MD, FACS, and Michael J. Zinner, MD, FACS

Call to Action: Recommendations …..impetus for a concerted effort by the ACS, ABS, and the RRC to further refine and implement them.

Annals of Surgery • Volume 241, Number 1, January 2005
The Committee was charged with examining the multitude of forces impacting health care and making recommendations regarding the changes needed in surgical education to enhance the training of surgeons to serve all the surgical needs of the nation, and to keep training and research in surgery at the cutting edge in the 21st Century.
Blue Ribbon Committee Report Headings:

- Surgical/Medical Workforce
  - Medical student education in surgery
  - Resident workhours and lifestyle in surgery
- Residency education in surgery
- The structure of surgical training
- Education support and faculty development
- Training in surgical research
- Continuous professional development
Surgeons as Innovators and Leaders of Patient Care

“The research and innovation of American surgeons throughout the centuries has contributed significantly to scientific knowledge and has helped develop the best patient care in the world”:

- ORGAN TRANSPLANTATION
- OPEN HEART SURGERY
- CLINICAL NUTRITION
- JOINT REPLACEMENT
- BIOMATERIALS
- ARTIFICIAL ORGANS

Annals of Surgery • Volume 241, Number 1, January 2005
Surgeons Unique Advantages as Innovators

- “Surgeons must exploit their unique advantages; the most clear of which is direct proximity to disease that yields a vivid understanding of both patient needs and care delivery logistics.

- Many great ideas emerge from navigating a difficult situation; and this is something that nonclinicians simply do not experience.

- Surgeons also have unprecedented access to properly phenotyped biological samples”

The Gap in Surgical Education

- Research training in surgery lacks structure, organization, and oversight.

- Lack of adequate protected time for research

- Lack of a national agenda for research training

- Research experience should benefit the individual

*Annals of Surgery* • Volume 241, Number 1, January 2005
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Evolution of the OSU DOS Professional Development Program

- Initiated in 2002 by
  - DOS Chair: Chris Ellison MD
  - Residency Program Director: Mark Arnold MD

- Early Actions
  - Dedicated Time for PD: 1 year
  - Research Training Program Director
  - Dedication of Financial Resources to Resident PD

- Overall Goal
  - Support the development of future leaders in surgery
Program Metrics: Departmental Core Goals of a Surgical Training Program

1. Clinical Mastery of Surgery:
   ▪ Medical Knowledge, Surgical Technique & Judgment and Patient Care.

2. Academic Mastery of Surgery:
   ✓ Mature critical thinking skills
   ✓ Transform clinical observations into research questions & well-designed projects
   ✓ Acquire investigative skills that ultimately improve surgical care & outcomes
   ✓ Learn how to advocate and lead
Evolution of the OSU DOS Professional Development Program

- **Challenges**
  - Cultural barriers among the residents
  - Cultural barriers among the faculty
  - Minimal interaction with research faculty outside DOS

- **Strengths**
  - Key DOS faculty support
    - Center for Minimally Invasive Surgery (CMIS)
    - Comprehensive Cancer Center (CCC)
    - Hepatobiliary and Pancreatic Cancer
    - NCH Pediatric Surgery Group
    - Comprehensive Transplant Center
Evolution of the OSU DOS Professional Development Program

- Cultural Change
  - Leaders in Surgery develop expertise
    - Clinical/Surgical Care
    - Motivation to improve patient care
    - Attuned to the identification of important clinical questions
  - Essential tools in this path
    - Research education & training
    - Mentors
    - Collaborators
    - Track record: Presentations, Publications, Awards
Evolution of the OSU DOS Professional Development Program
Structure: 3 Phases

I. Preparation
   a) Recruitment
   b) DOS Residency Program Director
   c) Research Training Program Director

II. Training
   a) Masters Degree: MMS, MPH, MBA, MA
   b) Research mentorship

III. Post Degree Career Mentorship
Phase I: Preparation

- Fall Meeting with PGY1s & PGY2s
- Individual Meetings with PD, RPD and PIs
  - Career aspirations
  - Review CV & Research experience
  - Funding opportunities
  - Potential research projects
- Resident Peer to Peer
- Mentor Selection
- Project Development
- Tailored Curriculum
- Research Fellowship Application (local, national)
- NIH Loan Repayment Program Application
- Application to Graduate School (MMS)
Phases II: Training

- Mentored Research
  - Scientific Presentations
  - Publications
- MMS Didactics
- MMSP Quarterly Meetings
- MMS Exam
  - DOS Grand Rounds Presentations
- Minimum Graduation Requirements
  - 30 credits
  - 3.0 GPA
  - MMS Exam
DOS RTP Quarterly Agenda

- Academic Progress (credits, core requirements, gpa)
- Trainee Research Progress Report
- Curriculum Updates (new courses)
- Calendar
  - Upcoming OSU Research/Research Training Events
  - Upcoming meetings
  - Schedule of MMS Exam presentations
- Grant Opportunities
- Recognition of Scholarly Achievements
Recognition Section of Autumn 2015 DOS RTP Quarterly Meeting

- **Shayna Brathwaite MD**: NIH/NMA Travel Award. National Medical Association Convention & Scientific Symposium in Detroit, Michigan August 2015.

- **Daniel Lodwick MD**: the SUS Karl Storz Resident Research Scholarship Award for his project entitled, "Radiation Dose Tracking in Computed Tomography".

- **Michelle Nguyen MD** on receiving the AAMC Learning Health System Pioneer Award ($10,000) for her project entitled, “The cost of quality: how do we calculate Value-based care?” Michelle is also the recipient of the Center for Integrative Health & Wellness (CIHW) Buckeye Pilot Research Grant ($7,500) for her project entitled, “Improving patient safety and satisfaction by decreasing physician burnout.”

- **Terry Rager MD MS** on his upcoming presentation of his paper, “Exosomes Secreted from Bone Marrow-Derived Mesenchymal Stem Cells Protect the Intestines from Experimental NEC”, at the 2015 AAP National Conference & Exhibition being held in Washington, D.C.

- **Taehwan Yoo MD** on receiving the 2016 James King Award
Masters of Medical Science Degree
(College of Medicine Program open to all OSUWMC residents and fellows)

- Core Requirements
  
  I. Research Design & Methodology
  II. Biostatistical Analysis
  III. Research Ethics
  IV. Science Communication
Masters of Medical Science Degree
(College of Medicine Program open to all OSUWMC residents and fellows)

- Development of new courses
  - Career Development for Surgeons
  - Business Management for Surgeons

- Electives
  - Health Policy
  - Topic Specific Journal Clubs
  - Pharmacogenomics
  - Biomedical Informatics
  - Clinical Informatics
  - Survey Design…
Translational Science Curriculum

- Topics of broad relevance
  - Immunology & Inflammation
  - Host Pathogen Science
  - Cancer Biology & Therapeutics
  - Wound Healing & Regeneration
  - Pharmacogenomics

- Minimize in-class time to facilitated discussion
- Exposure to faculty from many disciplines
- Pair research and clinical faculty
Multidisciplinary Class: SP TS Curriculum
# New! Career Development for Surgeons Course

**SPRING 2014**

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
<th>Title</th>
<th>Topic</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>24-Apr</td>
<td>30-Apr</td>
<td>Evaluation of Research I</td>
<td>Critical review of the literature and interpretation of clinical trials</td>
<td>Schmidt</td>
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<tr>
<td>24-Apr</td>
<td>30-Apr</td>
<td>Evaluation of Research II</td>
<td>Reviewing a manuscript (in-class activity)</td>
<td>Schmidt</td>
</tr>
<tr>
<td>5-May</td>
<td>Prep for a Career in Academic Surgery I</td>
<td>Planning your career and preparing your CV and effective e-mail and other correspondence</td>
<td>Arnold</td>
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<tr>
<td>7-May</td>
<td>Prep for a Career in Academic Surgery II</td>
<td>Networking, surgical societies, looking for your first job</td>
<td>Ellison</td>
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<tr>
<td>12-May</td>
<td>Prep for a Career in Academic Surgery III</td>
<td>Negotiating your first job, mentorship, setting up your lab or research program</td>
<td>Black &amp; Whitson</td>
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<td>19-May</td>
<td>Prep for a Career in Academic Surgery IV</td>
<td>Establishing successful research collaborations; financial management of grant funds</td>
<td>Carson</td>
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<tr>
<td>21-May</td>
<td>Prep for a Career in Academic Surgery V</td>
<td>Leadership skills and other opportunities in academic medicine</td>
<td>Higgins</td>
<td></td>
</tr>
<tr>
<td>28-May</td>
<td>Prep for a Career in Academic Surgery VI</td>
<td>Time management and work-life balance</td>
<td>Higgins</td>
<td></td>
</tr>
</tbody>
</table>
MASTER OF MEDICAL SCIENCE PROGRAM

MMSP Corner

Master of Medical Science candidates have been active in the following investigations:

Joe Drosdeck, MD
Mentors: W. Scott Melvin, MD & Dean Mikami, MD

Abstracts accepted for presentation:


Abstract accepted for poster:

Sara Martin del Campo, MD
Mentor: William Carson, MD

Abstract accepted for presentation:

Mika Matthews, MD
Mentor: Gail Besner, MD

Publications – manuscripts:

Science Communication in Action
Dr. Carlos Pellegrini

“...the best surgery resident research conference I have attended....
Masters Exam: Individual Research Accomplishment

SURGERY GRAND ROUNDS
Research Presentation in partial fulfillment for the Master of Medical Science degree:

“miRNA Are Differentially Expressed in HCC: So What?”
Jon C. Henry, MD

Undergraduate Education: BS, Biology, The Ohio State University, Columbus, OH
Medical School: MD, The Ohio State University, Columbus, OH
General Surgery Residency: The Ohio State University, Columbus, OH
Research Advisors: Carl R. Schmidt, MD, assistant professor of clinical surgery, Division of Surgical Oncology
Thomas D. Schmittgen, PhD, associate professor and chair, Pharmaceutics

Research Presentations:
Edward F. Hayes Graduate Forum Ohio State University – Oral Presentation – “miR-199a-3p targets CD44 and reduces proliferation and invasion of CD44 positive hepatocellular cell lines.” March, 2011.
Columbus Surgical Society – Columbus, OH – Oral Presentation – “miR-199a-3p targets CD44 and reduces proliferation and invasion of CD44 positive hepatocellular cell lines.” March, 2011.
American Association of Cancer Researchers Annual Meeting - Poster Presentation “miR-199a-3p targets CD44 and reduces proliferation of CD44 positive hepatocellular carcinoma cell lines” April 2011.
Ohio State College of Medicine – Research Day – Poster Presentation - “miR-199a-3p targets CD44 and reduces proliferation of CD44 positive hepatocellular carcinoma cell lines” April 2011.
Ohio State Department of Surgery Research Day – Oral Presentation “miR-199a-3p targets CD44 and reduces proliferation of CD44 positive hepatocellular carcinoma cell lines” May, 2011.
Ohio State College of Pharmacy Research Day – Poster Presentation - “miR-199a-3p targets CD44 and reduces proliferation of CD44 positive hepatocellular carcinoma cell lines” May, 2011

Research Publications:
McNally ME, Collins A, Wojcik S, Lui J, Henry JC, Jiang J, Thomas Schmittgen T, Bloomston M. Concomitant dysregulation of miR-151-3p and miR-126 correlates with improved survival in resected cholangiocarcinoma. [Accepted to the Journal HPB with revisions]

Research Awards:
Platinum (1st-place) Award at the Columbus Surgical Society – President’s Symposium, 2011
Travel Award Recipient from the Ohio State College of Medicine Research Day – Trainee Presentation Day – Resident Category, 2011
2nd Place – American College of Surgeons – Ohio Chapter – Holzer Medical Center Award, 2011
Best Abstract Clinical/Translational Science – Ohio State University College of Pharmacy Research Day, 2011
First Place – 16th Annual Ohio State University Department of Surgery Research Day, 2011
NIH Loan Repayment Recipient, 2010-2012
NIH T32 in Cancer Research Recipient, 2010-20
Phase 3: Post-Degree Career Development

- Career Advisory Committee
  - Presentations at National Meetings
  - Completion of manuscripts submitted for publication
  - Development of new ideas for research studies
  - Application for research project funding
  - Fellowship/Position opportunities
  - Preparation of CV/resume
  - Letters of Recommendation
Advanced Research Training for Surgical Trainees
(3 Phases)

**Phase I**
- Program Information
- Mentor Selection
- Curriculum Development
- Fellowship Application
- NIH LRP Application
- Application to the Graduate School (MMS)

**Phase II**
- Orientation
- Self-Assessment
- James King Research Presentations
- Quarterly Meetings
- MMS Didactics
- Mentored Research
- Professional Development
- Trainee Evaluation
- MMS Exam
- Career Advisory Committee

**Phase III**
- Career Advice
- Research Presentations
- Scientific Travel
- Publications
- Leadership Activities
- Fellowship/Position Application
- Letters of Recommendation

Tailored to the Individual
Protected Time Core Curriculum
Career Goal Oriented
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- New Directions
Metrics of Success: A Longterm Continuum

- Recruitment: Quality, Diversity
- Benefit to the Individual
- Individual Research Accomplishments
- Delivery of High Quality Evidenced-Based Surgical Care
- Placement into Prestigious Fellowships
  - Transition into Academia
  - Continued Publication & Presentation
  - Engagement in Research as PI or Co-I
  - Engagement in Research Team Leadership
  - Transition into Surgical Leadership in Private Practice
Diversity of Incoming OSU Surgery Housestaff (Gender Distribution 2002-2013)

2012-13
2010-11
2008-09
2006-07
2004-05
2002-03

Male
Female

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER
Incoming Housestaff
(URM distribution 2002-2013)
### Diversity: Snapshot of OSU General Surgery Categorical Residents

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Residents</th>
<th>Male %</th>
<th>Female %</th>
<th>URM %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>24</td>
<td>84%</td>
<td>16%</td>
<td>4%</td>
</tr>
<tr>
<td>2013-2014</td>
<td>38</td>
<td>50%</td>
<td>50%</td>
<td>29%</td>
</tr>
</tbody>
</table>

**NIH Director: Francis Collins MD PhD:**

“The biomedical research enterprise must engage all sectors of the population in order to solve the most complex biological problems and discover innovative new ways to improve human health.”

“Enhancing the Diversity of the NIH-funded Workforce”

Resident Professional Development Degrees Completed 2006 - 2015

- 35 Residents Completed Degrees
- 7 Completed SCC Fellowship

**MMSP**

- 35

**SCC Fellowship**

- 7

**MBA**

- 2

**MPH**

- 2

**Anatomy**

- 1
Benefit to the Individual

OSU Surgical Trainees in Research Training (2002-2013)

# Surgical Trainees

Year


Female  Male

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

<table>
<thead>
<tr>
<th></th>
<th>Alumni Group= DOS Residency/MMSP Alumni</th>
<th>Current Trainee Group= DOS Surgical Research Trainee</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># Trainees</strong></td>
<td>15</td>
<td>21 (5/21 just started July 2013)</td>
<td>36</td>
</tr>
<tr>
<td>Total Publications</td>
<td>77</td>
<td>79</td>
<td>156</td>
</tr>
<tr>
<td>1st Authored Publications</td>
<td>29</td>
<td>32</td>
<td>61</td>
</tr>
<tr>
<td>Scientific Presentations:</td>
<td>58</td>
<td>69</td>
<td>127</td>
</tr>
<tr>
<td>Total Research Awards Received</td>
<td>10</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Major National Research Award</td>
<td>3</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>NIH T32 support</td>
<td>3</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>NIH LRP</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Trainee Placement into Fellowships</td>
<td>11</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Average number of total publications</td>
<td>5.1 per trainee</td>
<td>4.9 per trainee</td>
<td></td>
</tr>
<tr>
<td>Average # of 1st authored publications</td>
<td>1.9 per trainee</td>
<td>2.0 per trainee</td>
<td></td>
</tr>
</tbody>
</table>
Pursuit of Diverse Fellowships

- Cardiovascular: 2
- Colorectal: 3
- Critical Care: 7
- Hepatobiliary: 1
- Minimally Invasive Surgery: 2
- Plastic Surgery: 2
- Surgical Oncology: 3
- Transplantation: 2
- Vascular: 4
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- Challenges
- New Directions
Initial Investment & Financial Sustainment

- Resident Stipend: GME PGY2/3 level
  - 50% supported by the DOS
  - 50% supported by the Research Mentor
- Resident Travel
- Resident Educational resources
- Program Staffing
- Degree Tuition
Initial Investment & Financial Sustainment

- Resources for Intramural & Extramural Grants
  - Graduate School University Fellowships
  - Institutional NIH T32s
    - T32 in Cancer
    - T32 in Tumor Immunology
  - Society Grants
  - NIH Minority Supplements
  - NIH F32
  - Pelotonia Fellowships (Cancer Research)
  - CTSA
Program Metrics: Financial Sustainability

![Chart showing program metrics over different years with categories for Total Salary, DOS, NIH & Extramural, and Other.](chart.png)
Program Metrics: NIH

NIH Training Grant Review Criteria

1. Training Program Director
2. Training Program, Environment & Institutional Support
3. Quality of the Trainees
4. Quality of the Mentors
5. Trainee Track Record
DESCRIPTION (provided by applicant): The goal of the OSU Advanced Research Training in Immunology for Surgery Trainees (ARTIST) program is to prepare surgical residents (postdoctoral trainees) for translational research careers involving study of how immune mechanisms affect tissue injury, repair, regeneration and replacement. This program is uniquely focused, serving a need that cannot currently be met at OSUWMC or perhaps anywhere else. As such, ARTIST will be a new paradigm for study and adoption by programs at other medical colleges. ARTIST integrates Immunology didactics, research-in-progress seminars and journal clubs from the College of Medicine Biomedical Sciences Graduate Program, as well as Translational Research courses from a novel "Signature Program Translational Science Curriculum," core courses in the Masters of Medical Science Program (Research Design, Grant Writing, Research Ethics, Biostatistics), and a new "Career Development for Surgeons" course. In addition, networking opportunities and an annual program retreat will offer unique opportunities for career development. National leaders and department chairs in surgery, especially those who have first-hand experience as visiting professors, recognize the strengths of the OSU Department of Surgery's Residency and Research Training Program. A small cadre of our surgical trainees, all training grant eligible and highly diverse (~30% URM, 50% female), will be selected for ARTIST. We will also invite trainees from other academic institutions by competitive application. Trainees will dedicate two full-time years, without clinical responsibilities, towards research education and training, earning a Master's of Science in Medical Science degree. They will be prepared to apply their training to deepen understanding of the immune system, as well as developing new, immune-based diagnostics, prognostics, therapeutics and clinical approaches that are relevant to surgical procedures and outcomes. While in the program they will also learn how to develop and draw upon clinical databases that integrate surgical outcomes with data from pathology and immunology. ARTIST Faculty Trainers who lead or participate in NIH-funded Program Projects (P01) and Specialized Programs of Research Excellence (SPORE) will provide context for use of such valuable databases in cores for collaborative team science. Infrastructure for ARTIST will include relevant OSU institutional research centers, research cores, outstanding training faculty and departmental administration. ARTIST's NIH-funded faculty, with distinguished track records in immunology and translational research, have been specially selected to inspire and guide trainees in immunology-focused mentored research. Clinical co-mentors and a post-training longitudinal, career advisory committee will provide guidance and facilitate placement into prestigious fellowships and academic faculty positions for ARTIST trainees. The national impact of the ARTIST program will be realized through scientific maturation of a trainee group with comprehensive clinical expertise, with the ability to apply the power of immunology-based research to benefit surgical patients.
Immune Mechanisms
of Tissue Injury

Immune Biomarkers &
Therapeutics

Immune
Mechanisms
and Tissue
Repair/
Regeneration/
Replacement

Development of Tissues
Repositories

Development of Integrated Clinical Databases

Conduct of Clinical Trials

Basics of Technology &
Commercialization

Neuroimmunology

The Ohio State University
WEXNER MEDICAL CENTER
First ARTIST T32 Awardees

Teaching tomorrow’s surgeon-scientists

For more than ten years the OSU Department of Surgery has supported the development of academic surgical careers by encouraging its residents to pursue research training through the OSU College of Medicine’s Master of Science in Medical Science degree program (MMSP). This program offers a tailored research curriculum combined with a mentored research experience for residents and fellows in clinical training programs at Ohio State and Nationwide Children’s Hospital. Our mission is aligned with national efforts to support the physician-scientist pipeline. The General Surgery training program aims not only to train superb surgeons but also has the goal to develop future leaders in surgery.

Our residency program is distinguished by its inclusion of a professional development year to complement the five clinical training years. Many residents pursue two full years of mentored research training along with didactics available through the MMSP. These efforts which resulted in outstanding research accomplishments by our high quality surgery trainees, provided a foundation for application to the National Institutes of Health for an institutional training grant (NIH T32 funding mechanism) to further develop and enhance the research education and training momentum achieved over the previous decade.

The goal of the ARTIST program is to train and inspire a unique cadre of surgeon-scientists to translate astute observations at the bedside, in the operating room, and in the clinic into novel hypotheses that can be interrogated through immunology-focused translational research. Ultimately these surgeon-scientist research programs will accelerate the movement of discoveries in immunology for development of immune-based diagnostics, prognostics and/or therapeutics.

“The areas of research supported by this T32 are relevant to surgeons who work with tissues daily in the operating room and who are uniquely qualified to identify the important surgical problems and potential solutions when tissues are insufficient or damaged through disease or surgery,” explains Dr. Bumgardner. These research areas include: immune mechanisms of tissue injury, immune mechanisms of tissue repair & regeneration, and applied immunology: diagnostic/prognostic biomarkers or immunotherapeutics.

Ekene Onwuka, MD, who investigates tissue-engineered vascular grafts in the lab of mentor Christopher Breuer, MD, was the first resident to be appointed to the new ARTIST T32. “The ARTIST grant has already impacted my career,” states Onwuka. “This career development program encouraged me to apply for, and be elected to a leadership position as the candidate member on the Association for Academic Surgeons Global Affairs Committee.”

Starting in July 2015 general surgery residents Eliza Beal, MD (mentors Sylvester Black, MD, PhD and Carl Schmidt, MD), Christopher McQuinn, MD (mentors Greg Lesinski, PhD and Mark Bloomston, MD) and Taehwan Yoo, MD (mentors Cameron Rink, PhD and Mourir Haurani, MD) will begin their ARTIST T32 programs.

Additional resources:
J Clin Invest: http://www.jci.org/articles/view/80933
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- Placement into Prestigious Fellowships
- Transition into Academia
- Continued Publication & Presentation
- Engagement in Research as PI or Co-I
- Engagement in Research Team Leadership
- Transition into Surgical Leadership in Private Practice, Health Systems, Academia, Industry, Government…
Program Metrics: National

- 2004 Blue Ribbon Committee
  - Structure, Organization, Integration
  - Benefits to the Individual
  - Protected Time
- Surgeon-Scientist Preparedness
  - Identification of Important Research Questions
  - Negotiation for Resources and Protected Time
  - Identification of Collaborators
  - Prepare an IRB/IACUC approved protocol
- Prepare competitive NIH (or other) grant proposals
- Lead a Research Team
- Lead a Clinical Trial
- Serve on Grant Review/Study Sections
New Directions

- Enhance Career Development for Surgeons Course
- Creation of an MMS Clinical Investigation Curriculum
- Creation of an MMS Health Outcomes Research Curriculum
  - ACS National Surgical Quality Improvement Program for Multispecialty (NSQIP) including the American College of Surgery Bariatric Surgical Program
  - Scientific Registry of Transplant Recipients (SRTR)
  - Society of Vascular Surgeons Quality Improvement
  - Carotid Surgery CMS national registry
  - Society of Thoracic Surgery national database (STS) for Cardiac and Thoracic Surgery
  - Intermax for LVAD registry
  - ELSO (Extracorporeal Life Support Organization)
  - National Burn program registry
- Creation of an Education Research Track
ACKNOWLEDGEMENTS: “The Village”

- Dr. Chris Ellison
- Dr. Mark Arnold
- Dr. Mark Bloomston
- Dr. Bill Carson
- Dr. Gail Besner
- Dr. Scott Melvin
- The Residents!
  - Heidi Pieper
  - Lynnsay Sinclair
  - Anna Patterson
  - Beth Hanson
  - Dennis Mathias
## Sample “Immunology Focused” Curriculum

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Credit</th>
<th>MMS Core* &amp; ARTIST Required**</th>
<th>Instructor</th>
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<tr>
<td><strong>SUMMER</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PubH-Bio 6280</td>
<td>Practical Biostatistics for Biomedical Laboratory Researchers</td>
<td>3</td>
<td>Biostatistics*</td>
<td>Draper</td>
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<tr>
<td>IBGP 8880.03</td>
<td>Signature Program Translational Science Curriculum: Wound Healing &amp; Regenerative Medicine</td>
<td>2</td>
<td>Translational Research Design**</td>
<td>Roy</td>
</tr>
<tr>
<td>SURG 8501</td>
<td>Career Development for Surgeons I</td>
<td>2</td>
<td>Surgeon-Scientist Career Training**</td>
<td>Bumgardner/ Schmidt</td>
</tr>
<tr>
<td>SURG 7193 xxx</td>
<td>Independent Study/Research</td>
<td>3</td>
<td>Mentored Research*</td>
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<td>Molecular and Cellular Immunology</td>
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<td>IBGP PhD Immunology Core**</td>
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<td>History of Immunology</td>
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<td>Elective**</td>
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<td>Surgeon-Scientist Career Training**</td>
<td>Bumgardner/ Schmidt</td>
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<td>VIS SCI 7970</td>
<td>Grantsmanship</td>
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<td>Science Communication*</td>
<td>Zadnik</td>
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<td>MVIMG 8010</td>
<td>Selected Topics in Advanced Immunology</td>
<td>3</td>
<td>Journal Club**</td>
<td>Turner</td>
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<td>SURG 8503</td>
<td>Career Development for Surgeons III</td>
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<td>Surgeon-Scientist Career Training**</td>
<td>Bumgardner/ Schmidt</td>
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# New! Career Development for Surgeons Course

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<th>SUMMER 2013</th>
<th>SURG 8501.01</th>
<th>Topic</th>
<th>Faculty</th>
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<tbody>
<tr>
<td>12-Jun</td>
<td>Intro Why Be an Academic Surgeon?</td>
<td>Career path options for surgeon-scientist; fundamental areas of research; mentorship best practices</td>
<td>Bumgardner</td>
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<td>19-Jun</td>
<td>The Scientific Method</td>
<td>Developing a hypothesis; essentials of study design</td>
<td>Schmidt</td>
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<tr>
<td>26-Jun</td>
<td>Basic Science I</td>
<td>Selecting and developing relevant basic science models - cell culture and tissue</td>
<td>Phay</td>
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<tr>
<td>3-Jul</td>
<td>Basic Science II</td>
<td>Selecting and developing relevant basic science models - small animal models</td>
<td>Coppola</td>
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<tr>
<td>10-Jul</td>
<td>Clinical research I</td>
<td>Developing, maintaining and analyzing clinical databases</td>
<td>Bloomston</td>
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<td>17-Jul</td>
<td>Clinical research II</td>
<td>Research with large clinical databases, health services and surgical education research</td>
<td>Sen</td>
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<td>24-Jul</td>
<td>Research ethics</td>
<td>Confidentiality and HIPAA, Intellectual Property, Technology Transfer, Research Compliance</td>
<td>Roy</td>
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<td>21-Aug</td>
<td>Analysis of Research I</td>
<td>Rink</td>
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<td>28-Aug</td>
<td>Analysis of Research II</td>
<td>Go</td>
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<td>4-Sep</td>
<td>Analysis of Research III</td>
<td>Ma</td>
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<td>11-Sep</td>
<td>Preparing and Presenting Research I</td>
<td>Hazey</td>
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<td>18-Sep</td>
<td>Preparing and Presenting Research II</td>
<td>Roy &amp; Zimmerer</td>
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<td>25-Sep</td>
<td>Preparing and Presenting Research III</td>
<td>Carson</td>
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<td>Ma</td>
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<td>9-Oct</td>
<td>Funding for Research II</td>
<td>Bumgardner</td>
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<td>16-Oct</td>
<td>Funding for Research III</td>
<td>Gengler-Nowak</td>
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<td>Funding for Research IV</td>
<td>Sen</td>
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<td>30-Oct</td>
<td>Funding for Research V</td>
<td>Besner</td>
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</table>

New! Career Development for Surgeons Course
Benefit to the Individual
Track Record of Success

◆ Top Number of Publications
  - Peter Nau: 12
    - Minimally Invasive Surgery
  - Jon Henry: 10
    - Hepatocellular Carcinoma
    - Malignant Small Bowel Obstruction
  - Jon Wisler: 8
    - miRNAs circulating biomarkers in sepsis
    - Burn/frostbite injury, critical care & trauma
  - Amy Collins: 7
    - Pancreatic Cancer
Phase I: Preparation
A Case Study

- A PGY2 interested in obesity and inflammation research; career in pediatric surgery
- OSU Adult Bariatric Surgery, NCH Bariatric Surgery
- NIH Funded Endocrinologist studying obesity and inflammation
- Co-mentorship Team: MD PhD Endocrinologist, OSU Bariatric Surgeon, NCH Program Director Liaison
- Masters Degree: Immunology Focused Curriculum
- Extramural Fellowship Applications
### James King Research Awardees 2005-2013

<table>
<thead>
<tr>
<th>Resident Name</th>
<th>Award Year</th>
<th>Research Topic</th>
<th>Mentor(s)</th>
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</thead>
<tbody>
<tr>
<td>Lloyd Brown MD MS</td>
<td>2005</td>
<td>Tumor Immunology</td>
<td>William Carson MD</td>
</tr>
<tr>
<td>Vance Smith MD MBA</td>
<td>2006</td>
<td>Models for Faculty Reimbursement at AMCs</td>
<td>E. Christopher Ellison MD</td>
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<tr>
<td>Irina Shahknovich MD MS</td>
<td>2007</td>
<td>Development of a Mouse Model of Spinal Cord Ischemia</td>
<td>Philip Popovich PhD &amp; Hamdy Elsayed-Awad</td>
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<tr>
<td>Alicia Thomas MD MS</td>
<td>2008</td>
<td>CMV Virology</td>
<td>Charles Cook MD</td>
</tr>
<tr>
<td>Lisa Haubert MD MA</td>
<td>2008</td>
<td>Teaching Surgical Anatomy</td>
<td>Susan Moffat-Bruce MD</td>
</tr>
<tr>
<td>Amy Collins MD MS</td>
<td>2009</td>
<td>microRNAs &amp; Pancreatic Cancer</td>
<td>Mark Bloomston MD</td>
</tr>
<tr>
<td>Thomas Pham MD MS</td>
<td>2009</td>
<td>Humoral Immunity &amp; Transplant</td>
<td>Ginny Bumgardner MD PhD</td>
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<tr>
<td>Jon Wisler MD MS</td>
<td>2010</td>
<td>Novel Immune Biomarkers in Sepsis</td>
<td>Clay Marsh MD</td>
</tr>
<tr>
<td>Laura Peterson MD MS</td>
<td>2010</td>
<td>Vascular Repair &amp; Regeneration after Cerebral Ischemia</td>
<td>Cameron Rink PhD &amp; Michael Go MD MS</td>
</tr>
<tr>
<td>Mika Matthews MD MS</td>
<td>2011</td>
<td>Intestinal Inflammation &amp; Repair</td>
<td>Gail Besner MD</td>
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<tr>
<td>Rachel Sullivan MD MS</td>
<td>2012</td>
<td>Hepatocellular Carcinoma &amp; Inflammation</td>
<td>Jacob Samson PhD &amp; Carl Schmidt MD</td>
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<tr>
<td>Kara Keplinger MD MS</td>
<td>2013</td>
<td>P21 Activated kinase as a therapeutic target in Papillary Thyroid Cancer</td>
<td>Matthew Ringel MD</td>
</tr>
<tr>
<td>Terrence Rager MD MS</td>
<td>2013</td>
<td>Production of Tissue Engineered Intestine</td>
<td>Gail Besner MD</td>
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</tbody>
</table>
Association for Academic Surgery

The pediatric surgeon’s road to research independence: utility of mentor-based National Institutes of Health grants

Alice King, MD,a Ian Sharma-Crawford,a Aimen F. Shaaban, MD,a Thomas H. Inge, MD, PhD,a Timothy M. Crombleholme, MD,b Brad W. Warner, MD,c Harold N. Lovvorn III, MD,d and Sundeep G. Keswani, MD a,*

a Division of Pediatric, General and Thoracic Surgery, Cincinnati Children’s Hospital and the University of Cincinnati College of Medicine, Cincinnati, Ohio
b Division of Pediatric Surgery, The Children’s Hospital Colorado, Aurora, Colorado
c Division of Pediatric Surgery, Washington University School of Medicine, St. Louis, Missouri
d Department of Pediatric Surgery, Vanderbilt University Medical Center, Nashville, Tennessee

Fig. 2 – Percentage distribution of funds by NIH institutes

Fig. 3 – Distribution of funding obtained following the mentor-based K08 award among recipients of expired K08 awards.
What does it take to be a successful pediatric surgeon-scientist?

Carey Watson, Alice King, Shaheel Mitra, Aimen Shaaban, Allan Goldstein, Michael Morowitz, Brad Warner, Timothy Crombleholme, Sundeep G. Keswani


![Financial Support Provided by Institution](image)

- Mentorship 38%
- Protected Time (29%)
- Persistence 19%
- Hard Work 12%

Fig. 3. Financial support provided by institutions for laboratory support and supplies.
NIH Fellowships/Support

- 2000: Ergun Kocak
- 2003: Lloyd Brown
- 2005: Kristin Guenterberg
- 2006: Iyore James
- 2007: Amy Collins
  - CCTS TL1
- 2007: Eric Luedke
- 2008: Jon Henry
- 2009: Sara Martin del Campo
- 2009: Mika Matthews
- 2010: Justin Huntington
- 2010: Nicholas Latchana
- 2010: Robert Plews
- 2011: Sara Mansfield
- 2012: Shayna Brathwaite,
  Ekene Onwuka, Taewan Yoo,
  Shalynn Bennett
- 2013: Eliza Beal, Chris McQuinn
Prestigious Awards/Fellowships

- 2004: Meghan Forster
  Surgical Infection Society Fellowship

- 2006: Peter Nau
  AHPBA Fellowship

- 2007: Thomas Pham
  American Society of Transplant Surgeons/ NKF Fellowship

- 2007: Amy Collins
  AACR Pancreatic Cancer Research Award

- 2008: Jon Wisler
  University Fellowship

- 2011: Sara Mansfield
  Univ Fellowship (declined)
  SUS Finalist

- 2011: Kara Keplinger
  Pelotonia Fellowship

NIH LRP:
- Jon Henry
- Mika Matthews

Davis Bremer
Engagement in Research as PI/Co-I
Grant/Project Submissions

- Ergun Kocak  NIH R21, Co-PI (funded)
- Amy Collins  AACR-FNAB Fellows Grant for Translational Pancreatic Cancer Research (funded)
- Jon Wisler  Davis-Bremer Award (funded)
- Jon Henry  NIH F32 (not funded)
- Laura Peterson  IRB protocol (approved)
- Thomas Pham  ASTS Transplant Fellow Research Grant (not funded)
Engagement in Research as PI/Co-I
Grant/Project Submissions

- Ekene Onwuka  SUS (not funded)
  NIH F32 (in review)
- Terry Rager  SUS (finalist)
- Michelle Nguyen  SUS (finalist)
  Intramural award (funded)
- Daniel Lodwick  SUS (funded)
  NIH F32 (not funded)
Leadership

- Engagement in Research as PI or Co-I
  - Vascular Fellowship Research Project: Laura Peterson

- Engagement in Research Team Leadership
  - OSU Liver Cancer Research: Mary Dilhoff

- Transition into Surgical Leadership in Private Practice
Surgical Leadership in Private Practice

- Lisa Haubert MD MA
  - PP Colorectal Surgery, Houston, Texas
  - Co-chair of the General Surgery Forum at the American Society of Colon and Rectal Surgeons (ASCRS)
  - Medical Director of the Pelvic Health Center

- Natalie Jones MD MS
  - PP Surgical Oncology, Columbus, Ohio
  - Medical Director for the OhioHealth Skin Cancer Advisory Group
  - Cancer liaison physician to the ACS Commission on Cancer for Dublin Methodist Hospital (responsible for evaluating, interpreting, and reporting the faciologies performance data through the National Cancer Data Base (NCDB) and facilitating quality improvement initiatives
I believe that surgeons are uniquely poised in translational research due to access to human tissue samples, a unique clinical thought process, and treatment focused applications.

Comments from the DOS Residents
Comments from the DOS Residents

My training in the MMSP program has allowed me to both enjoy research more as well as be more comfortable with conducting, discussing, and evaluating research. My work in this program has made me appreciate that research must be a part of a physician's practice in academics and private-practice. My participation in this program has influenced me to pursue a career in academic surgery. ...My work over the two years in MMSP has prepared me for both clinical research and collaborations with basic science researchers to create truly translation research.

Finally, the program has improved the patient care and education aspects of my career. My practice will be more research based, but critical of the research as well and my teaching will be research based and on how to use research in patient care.
Comments from the DOS Residents

I believe that a research focused curriculum as a surgical trainee provides an invaluable protected time to develop the tools necessary for meaningful scientific contribution. It becomes difficult as a surgeon, without this time, to develop the necessary skill set to participate in basic science or translational research due to the demands required of an early clinical practice.
Program Funding Goals

◆ Institutional Training Grants
  ▪ Compete for Current T32 positions
    ▪ Cancer (Caligiuri, De LaChapelle, Carson)
    ▪ Musculoskeletal (Guttridge)
    ▪ Cardiovascular (Mohler)
    ▪ Bioinformatics (Payne)
  ✓ Advanced Research Training in Immunology for Surgical Trainees (Funded!)

◆ Individual Research Fellowships
  ✓ SUS Research Grant
  ▪ ACS Research Grant
  ▪ NIH F32 postdoctoral award
    ▪ Resident, PI of this career development award
    ▪ Faculty, Mentor Role
Pursuit of Diverse Fellowships

- Cardiovascular: Quarrie*, Spata
- Colorectal: Haubert, Kuhrt, Thomas
- Critical Care: Beery, Fisher, Crockett, Evans, Vance Smith* (MBA), Kincaid, Jon Wisler
- Hepatobiliary: Collins
- Minimally Invasive Surgery: Luedke*, Nau*
- Plastic Surgery: Wallace, Kocak
- Surgical Oncology: Dillhoff*, Hatzaras* (MPH), Forster
- Transplantation: James, Pham*
- Vascular: Go*, Shaknokovich, Peterson, Henry*
Transition into Academia

- 2002: (William Wallace)
- 2003:
- 2004:
- 2005: Go, (Beery), (Kocak),
- 2006: Brown
- 2007: Jones, Fisher
- 2008: Forster, Shaknovich
- 2009: Dilhoff, Guenterberg
- 2010: James, Nau, Thomas
- 2011: Kincaid, Kuhrt, Collins, Pham, Quarrie
- 2012: Henry, Luedke, Peterson, Wisler
- 2013: Matthews, del Campo, Wendling, Spata