FUNDING SUPPORT:

The “Howard Cancer Scholars Program” and the “Summer Research Experience Program in Cancer Science” are supported by funding from the National Cancer Institute of the National Institutes of Health under award number: R25CA181003.

The “Howard Prostate Cancer Scholars Program” is supported by funding from the Department of Defense under award number: PC131811.
Roswell Park Cancer Institute in Buffalo, N.Y. is America’s first cancer center and a National Cancer Institute-designated Comprehensive Cancer Center conducting clinical care, research, education, and community outreach. The mission of Roswell Park Cancer Institute is to “understand, prevent, and cure cancer.”

Howard University students accepted into the one of the Roswell Park Internship Programs will:

- deeply explore their interest in cancer under the direction of active researchers at a leading Comprehensive Cancer Center;

- prepare for graduate education in the cancer sciences by reading cutting-edge scientific literature, participating in an intensive hands-on research experience, developing scientific communication skills, and experiencing the “bench-to-bedside” continuum of modern translational research;

- understand and become empowered to address issues of cancer health disparity in African-American and other underserved communities; and

- learn about the variety of career pathways and research areas within the cancer team, such as prevention, epidemiology, cancer biology, therapeutics development and clinical research.

Research Interests: My research interest is in androgen metabolism and androgen receptor signaling in prostate cancer. Specifically, his research projects are focused on prostatic androgen trafficking and metabolism by prostatic epithelial cells and cancer cells, and how androgen metabolism affects biology and clinical characteristics of prostate cancer. The ultimate goal is to delineate mechanisms underlying the progression of prostate cancer to castration recurrent disease, and to identify novel modalities to prevent or treat castration recurrent prostate cancer.
Mentor: Dhyan Chandra, PhD
Title: Associate Professor of Oncology
Member Graduate Faculty, Roswell Park Graduate Division, University at Buffalo

Research Interests: The research focus of Dr. Chandra’s laboratory is to identify and define various mitochondrial regulators of prostate cancer cell death. He also investigates the underlying mechanisms of prostate cancer health disparities among African American and European American men. The ultimate goal of his laboratory is to develop effective agents for prostate cancer therapy by targeting mitochondria.

Mentor: Gokul Das
Associate Professor of Oncology
Member Graduate Faculty, Roswell Park Graduate Division, University at Buffalo

Research Interests: Research in my laboratory focuses on crosstalk between estrogen receptors and p53 signaling in breast (luminal and triple-negative breast cancers), lung (non-small cell lung cancer), and ovarian (high grade serous ovarian cancer) cancers. Inactivation of p53 by multiple mechanisms is a frequent event in these cancers. Estrogen receptors alpha (ERα) and beta (ERβ) have important roles in normal and disease physiology of these organs. We have shown that both ERα and ERβ bind p53. Binding of ERα to p53 results in functional inactivation of p53, whereas ERβ-p53 interaction elicits context-dependent effects in cancer cells. We actively pursue opportunities to translate findings from the laboratory by developing innovative retrospective and prospective clinical studies. One such prospective clinical trial to investigate the role of p53 and ERα in breast cancer resistance to tamoxifen therapy is currently underway.

School Year Research Tele-mentorship:
Howard University students participate in an academic year tele-mentorship with an RPCI faculty research member. Students will read scientific literature relevant to the Roswell Park investigator’s field of study, including publications from their laboratory. Students will discuss these readings weekly for one hour via video chat with the Roswell Park faculty or graduate students and postdoctoral fellows in their labs. Students will be prepared through this pre-internship learning module to readily integrate background knowledge into their summer research internship and be productive in their research project.

Summer Research Experience Program in Cancer Science Internship:
Common to all three research experience programs is the “Summer Research Experience Program in Cancer Science.” This is a 10-week summer research internship program hosted at Roswell Park Cancer Institute. Students conduct a research project under the mentorship of their RPCI research faculty member and his/her laboratory staff. This core research experience is supported by curricular and professional development activities. The internship culminates in a cap-stone scientific talk and poster on the intern’s summer research project which they present to their fellow interns, faculty and staff at a concluding program-wide summer scientific conference.

ROSWELL PARK CANCER INSTITUTE’S CANCER RESEARCH EXPERIENCE PROGRAMS:

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**Howard Cancer Scholars Program:**
**Funded by National Institutes of Health (R25CA181003)**

Howard University Sophomores enrolled in the Honors Program and majoring in biology can explore a cancer topic in the field of expertise of a Roswell Park Cancer Institute (RPCI) faculty researcher across a variety of disciplines: cancer cellular and molecular biology, cancer biophysics, cancer epidemiology, cancer pharmacology/therapeutics or tumor immunology. Accepted Scholars develop an understanding of their selected research topic through mentored directed readings in preparation for conducting their own project in an immersive funded summer research internship experience. An Honors student successfully completing this program will satisfy Howard University’s Honors requirements and will be able to make an informed decision and competitive application to enter a graduate school in preparation for a career in cancer research. Funding support is provided by the National Institutes of Health (R25CA181003.)

**Eligibility Requirements:**

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**Research Interests:** One of the ongoing projects in the laboratory is focused on investigating the therapeutic potential of a novel combination strategy for castration-resistant metastatic prostate cancer (CRPC). The high mortality rate associated with CRPC underscores the critical need to investigate novel treatment approaches that can improve response rates in this patient population. Using clinically-relevant models, the research project will address several key questions of critical importance to the successful clinical translation of this approach. To determine the translational potential of this combination strategy for prostate cancer, we will conduct imaging-guided preclinical trials to characterize the vascular response of tumors to combined androgen deprivation and vascular-targeted therapy. The work is interdisciplinary in nature and draws on concepts from biophysics, cancer biology, pharmacology and molecular biology and clinical oncology.
Mentor: Joseph Barbi, PhD
Assistant Professor of Oncology

Research Interests: In order for the immune system to function properly, it must be tightly regulated. Failure to do so can inappropriately unleash the immune system’s impressive destructive power. Preventing the collateral damage and autoimmune disease that can result form out-of-control immune activation are a number of safeguards including Regulatory T cells. While these are necessary for immune control, they can also oppose the mounting of robust anti-tumor immune responses, limiting the benefits of many anticancer therapies. My research interests focus on the factors and processes that influence Regulatory T cells and other mechanisms of immune control. My lab is exploring the regulatory cell types and processes capable of controlling the immune system with an emphasis on unappreciated factors that may enhance or inhibit their suppressive functions. By advancing our understanding of how certain environmental cues, inflammatory stresses, and metabolic factors influence the mechanisms of immune regulation we will discovery ways to fine-tune immune responses and reveal new targets for future anticancer immunotherapies.

Mentor: Scott Abrams, PhD
Professor of Oncology
Member Graduate Faculty, Roswell Park Graduate Division, University at Buffalo

Research Interests: Our research interests have been devoted to understanding how the immune system achieves or fails to achieve a successful antitumor response. More specifically, our work focuses on mechanisms of tumor escape, immune suppression and immunotherapy. During the course of these studies, our laboratory has defined pivotal roles for interferon regulatory factor-8 (IRF8), a member of the IRF family of transcription factors, in tumor immunology. Key findings showed that when IRF8 is expressed it acts as a positive regulator of tumor-cell response to certain forms of cell death, as well as a negative regulator of myeloid-derived suppressor cell (MDSC) development. MDSCs are known to be potent inhibitors of antitumor immunity and their production appears to IRF8-dependent. Thus, we have identified previously unrecognized roles for IRF8 in tumor biology. Altogether, our goals are to better understand how the neoplastic process impairs host antitumor immune responses, thereby providing new avenues for prognostic or therapeutic opportunities.

Summer Internship Funding: You will receive a subsistence allowance of $4000 to cover your summer living expenses and lodging expenses at Canisius College dormitories for the 10-week duration of the program. Payments are made to interns on a bi-weekly basis during the summer internship period.
**Program Overview:**

**Howard Prostate Cancer Scholars Program:**

*Funding support is provided by the Department of Defense (PC131811.)*

African American men are more likely to develop more aggressive forms of prostate cancer, have earlier on-set of the disease and succumb to the disease at a higher rate than Caucasians. Howard University Sophomores enrolled in the Honors Program or non-Honors Juniors majoring in biology can select to be mentored by an RPCI Faculty researcher with prostate cancer expertise to conduct an in-depth learning and research experience on prostate cancer which includes a focus on underlying biological racial disparities in disease diagnosis and treatment. Accepted Scholars develop an understanding of their selected prostate cancer research topic through school year tele-mentorship with their RPCI Faculty researcher. These tele-mentor readings will satisfy course requirements of the “Directed Readings (I-III)” for Honors students and “Topics in Cell and Molecular Biology” for non-Honors students. Completion of the tele-mentor readings phase prepares students for a funded summer research experience in their mentor’s laboratory at Roswell Park where they will work on their own research project. Students will present a poster of their summer research at a national conference in their Senior year and receive continued mentorship. Honors students can satisfy Howard Honors requirements by completing all phases of this program. After his/her research experience, a Prostate Cancer Scholar is poised to enter a graduate training program and pursue a career in prostate cancer. Funding support is provided by the Department of Defense (PC131811.)

**Immunoology**

**Mentor: Elizabeth Repasky, PhD**

Professor of Oncology

The Dr. William Huebsch Professorship in Immunology

Member Graduate Faculty, Roswell Park Graduate Division, University at Buffalo

**Research Interests:** Dr. Repasky’s research program focuses on exploration of physiological (homeostatic) responses which can be manipulated to alter the tumor microenvironment and improve the efficacy of cancer therapies, including immunotherapies. For her research, she has helped to develop improved mouse models for testing novel therapies. A large amount of effort has been placed on understanding the role of body temperature on anti-tumor immune activity and on vascular function.

**Mentor: Sharon Evans, PhD**

Professor of Oncology

Member Graduate Faculty, Roswell Park Graduate Division, University at Buffalo

**Research Interests:** The overarching goal of our research program is to investigate the molecular mechanisms that control lymphocyte trafficking across blood vessel walls which are important checkpoints in the development of a fine-tuned adaptive immune response. These studies are particularly relevant to cancer immunotherapy since it is now recognized that the extent of T cell infiltration at tumor sites is a critical determinant of patient responses to immune-based therapies as well as standard chemotherapy and radiation.
MENTOR DIRECTORY

CANCER PREVENTION AND POPULATION SCIENCES

Mentor: Maciej Goniewicz, PhD, PharmD
Assistant Professor of Oncology

Research Interests: Dr. Goniewicz’s primary research area is in nicotine pharmacology, with a focus on nicotine dependence and smoking cessation. He has research experience in smoking cessation behavioral treatment, pharmacotherapy, and pharmacokinetics in both clinical and community-based settings. Dr. Goniewicz’s current research is focused on new nicotine-containing products and alternative forms of tobacco. He examines safety and efficacy of electronic nicotine delivery devices, commonly called e-cigarettes. These studies include the laboratory evaluation of the products, pharmacological and toxicological assessment, surveys among their users, and their potential application in harm reduction and smoking cessation. He also evaluates implementation of new tobacco control laws and role of community pharmacists in smoking cessation.

CELL STRESS BIOLOGY & IMMUNOLOGY

Mentor: Sandra Gollnick, PhD
Member, Department of Cell Stress Biology
Distinguished Professor, Department of Immunology
Member Graduate Faculty, Roswell Park Graduate Division,
University at Buffalo

Research Interests: Dr. Gollnick’s research focuses on the yin and yang of inflammation in the progression and treatment of cancer. Chronic inflammation contributes to the development and progression of many cancers, including prostate cancer. Dr. Gollnick’s laboratory explores how tumor cells co-opt the host immune system to promote chronic inflammation that leads to increased vascularization, suppression of anti-tumor immunity and increased tumor cell proliferation and migration. The goal of this work is to develop novel therapeutic targets based on increased understanding of the interaction of tumor cells and immune cells. Unlike chronic inflammation, acute inflammation promotes the development of anti-tumor immunity. Many anti-cancer modalities, including radiation, chemotherapy and photodynamic therapy (PDT), result in acute inflammation. PDT is an FDA approved anti-cancer modality used for the elimination of early disease and palliation of late stage malignancies. Dr. Gollnick’s laboratory has shown that PDT stimulates anti-tumor immunity that is capable of combating distant disease. Her current focus is on developing clinical protocols for the treatment of head and neck and lung cancers with a goal of providing enhanced tumor control, including control of metastases, with minimal effect of quality of life.

ELIGIBILITY REQUIREMENTS:

HOWARD PROSTATE CANCER SCHOLARS PROGRAM

<table>
<thead>
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<th>Mentors Available in</th>
<th>Prostate Cancer</th>
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<td>Sophomore Honor Students</td>
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<tr>
<td>When To Apply</td>
<td>October of Sophomore Year</td>
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<td>October of Junior Year</td>
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<tr>
<td>Citizenship</td>
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<td>Pre-Internship</td>
<td>3 Semesters of Tele-Mentored Directed Readings</td>
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<td></td>
<td>I-B Courses Beginning Spring of Sophomore Year</td>
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<tr>
<td>Internship</td>
<td>1 Semester of Tele-Mentored Topics in Cell and Molecular Biology in Spring of Junior Year</td>
</tr>
<tr>
<td>Post-Internship</td>
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</tr>
<tr>
<td>Funding</td>
<td>$6000 stipend</td>
</tr>
<tr>
<td>Application Deadline</td>
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</tr>
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<td>Details &amp; Application</td>
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Citizenship

U.S. or Permanent Resident of the U.S.

Pre-Internship

3 Semesters of Tele-Mentored Directed Readings I-B Courses Beginning Spring of Sophomore Year

Internship

10-week Summer Research Internship at Roswell Park between Junior & Senior years

Post-Internship

Use summer research as basis for writing an Honors Thesis, Present research at national scientific meeting

Funding

$6000 stipend

Application Deadline

October 30, 2016

Details & Application

RoswellPark.edu/education/summer-programs/cancer-scholars-application
Mentor: Joyce Ohm, PhD
Assistant Professor of Oncology

Research Interests: My laboratory is actively investigating how both genetic and environmental determinants may reprogram the epigenome and contribute to tumor initiation and progression. I currently have an NIH RO1 grant focused on epigenomic remodeling in stem cells and differentiated neural cells following exposures to environmental toxicant exposure as well as an ongoing program looking at epigenetic reprogramming in translocation associated soft-tissue sarcomas. My research lab regularly performs –omics level molecular analysis of normal, pre-malignant, and malignant cell populations including RNA-sequencing, ChIP-sequencing, and global methylation analysis, all of which are key elements of my ongoing research. Our long-term goals are to identify novel therapeutic strategies for the treatment of aggressive human cancers based on their molecular profiling.

Mentor: Irwin Gelman, PhD
Professor of Oncology
Member Graduate Faculty, Roswell Park Graduate Division, University at Buffalo

Research Interests: My research interests revolve around understanding how tyrosine kinases regulate signaling and cytoskeletal pathways under conditions of cell adhesion and motility, response to growth factors, and oncogenic transformation. The research projects in my lab have a special focus for biologies of cancer recurrence and/or metastasis (cell culture and mouse models), with a special emphasis on identifying and characterizing genes that regulate the aggressive behavior of cancer cells. The translational impact of these projects is in their use of clinical tissue, genomic and medical informatics data to stratify basic scientific findings with predictive clinical outcomes or to identify new therapeutic targets of advanced, metastatic breast and prostate cancer.

Summer Internship Funding: You will receive a stipend of $6000 to cover your summer living expenses and lodging expenses at Canisius College dormitories for the 10 week duration of the program. Payments are made on a bi-weekly basis during the summer internship period.
Available mentors and their research profiles:
The following Roswell Park Cancer Institute researchers have volunteered to participate as mentors to Howard University students accepted into the “Howard Prostate Cancer Scholar” and “Howard Cancer Scholar” programs. These mentors and their laboratory staff will tele-mentor on pertinent scientific literature, supervise the summer research internship and provide extended mentoring activities.

Mentors in the directory are categorized by their department affiliation. Highlighted in each mentor’s profile is their availability to serve as a mentor in the “Howard Prostate Cancer Scholars Program” or “Howard Cancer Scholars Program.” Eligible Howard students will indicate on the application the program for which they wish to be considered: “Howard Cancer Scholars,” “Howard Prostate Cancer Scholars” or both.

- Students applying to ONLY the “Howard Cancer Scholars” program may indicate on the application their preferences for any mentors listed as “Available to mentor in the Howard Cancer Scholars Program.”
- Students applying to ONLY the “Howard Prostate Cancer Scholars” program must indicate on the application their preferences ONLY for mentors listed as “Available to mentor in the Howard Prostate Cancer Scholars Program.”
- Students applying to BOTH the “Howard Cancer Scholars” and “Howard Prostate Cancer Scholars” should indicate at least TWO preferred mentors from among those listed as “Available to mentor in the Howard Prostate Cancer Scholars Program.”

Note: A Directory of Mentors for the “Summer Research Experience Program in Cancer Science” is not included here but will be available on-line (www.roswellpark.edu/education/summer) beginning in December after mentors have registered.

Available to mentor in the Howard Cancer Scholars Program
Available to mentor in the Howard Prostate Cancer Scholars Program

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PROSTATE CANCER SCHOLAR PROGRAM

PROGRAM TRACK: NON-HONORS JUNIOR BIOLOGY MAJORS

1. JUNIOR FALL
   APPLICATION, SELECTION AND PLACEMENT
   - Apply online by October 30, 2016
   - Identify which prostate cancer mentors match your interests.
   - Roswell Park and Howard University faculty will place five Cancer Scholars and match them to mentors.

2. JUNIOR SPRING
   TELE-MENTORED DIRECTED READINGS III
   - Complete “Topics in Cellular and Molecular Biology” course under the tele-mentorship of Roswell Park research faculty.
   - Read scientific literature relevant to the Roswell Park mentor’s field of study, including publications from their laboratory.

3. JUNIOR SUMMER
   PAID RESEARCH INTERNSHIP AT ROSWELL PARK
   - Upon satisfactory completion of the “Topics in Cellular and Molecular Biology”:
     - Admitted into Roswell Park’s summer research program.
     - Conduct your honors research project with your mentor.
     - Present a cap-stone scientific talk and poster on your summer research project to intern peers.

4. SENIOR YEAR
   PRESENTATION AT SCIENCE CONFERENCE AND HONORS THESIS
   - Present your research at a national scientific conference
   - Receive extended advisement from their RPCI faculty mentor on:
     - Preparation of your research poster
     - Preparation of graduate school applications and interviewing for graduate programs.

Summer Internship Funding: You will receive a stipend of $6000 to cover your summer living expenses and lodging expenses at Canisius College dormitories for the 10 week duration of the program. Payments are made on a bi-weekly basis during the summer internship period.
**Summer Research Experience Program in Cancer Science:**

*Funding support is provided by the National Institutes of Health (R25CA181003.)*

Undergraduate biology/science majors enrolled in their junior year at colleges nationwide may choose to explore a cancer topic at RPCI in one of several disciplines: cancer cellular and molecular biology, cancer biophysics, cancer epidemiology, cancer pharmacology/therapeutics or tumor immunology. Accepted students receive a funded summer research internship experience in the laboratory of a selected RPCI faculty researcher. Interns attend curricular and professional development activities as part of a formal program to support their core research experience. After his/her summer research experience, an intern is able to make an informed decision and competitive application to graduate school in preparation for a career in cancer research. This program is not specific to Howard University students; rather Howard applicants compete within a national applicant pool. Funding support is provided by the National Institutes of Health (R25CA181003.)

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**PROGRAM OVERVIEWS:**

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**Summer Research Experience Program in Cancer Science:**

*Funding support is provided by the National Institutes of Health (R25CA181003.)*

Undergraduate biology/science majors enrolled in their junior year at colleges nationwide may choose to explore a cancer topic at RPCI in one of several disciplines: cancer cellular and molecular biology, cancer biophysics, cancer epidemiology, cancer pharmacology/therapeutics or tumor immunology. Accepted students receive a funded summer research internship experience in the laboratory of a selected RPCI faculty researcher. Interns attend curricular and professional development activities as part of a formal program to support their core research experience. After his/her summer research experience, an intern is able to make an informed decision and competitive application to graduate school in preparation for a career in cancer research. This program is not specific to Howard University students; rather Howard applicants compete within a national applicant pool. Funding support is provided by the National Institutes of Health (R25CA181003.)

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**Summer Internship Funding:** You will receive a subsistence allowance of **$4000** to cover your summer living expenses and lodging expenses at Canisius College dormitories for the 10 week duration of the summer internship program. Payments are made to interns on a bi-weekly basis during the summer internship period.