AWARD NUMBER:  
W81XWH-14-1-0238

TITLE:  
Targeting Histone Abnormality in Triple-Negative Breast Cancer

PRINCIPAL INVESTIGATOR:  
Nancy E. Davidson, M.D.

CONTRACTING ORGANIZATION:  
University of Pittsburgh, Pittsburgh, PA 15213

REPORT DATE:  
August 2015

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PREPARED FOR:  
U.S. Army Medical Research and Materiel Command  
Fort Detrick, Maryland  21702-5012

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The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.
Like other cancers, triple negative breast cancer (TNBC) develops as a consequence of cumulative genetic and epigenetic changes. The goal of this funded proposal is to understand how changes in interaction of chromatin-remodeling enzymes contribute to TNBC development and to test novel targeted combination approaches of epigenetic drugs in restoration of aberrantly silenced tumor suppressor genes and inhibition of breast tumor growth. Our previous work suggested that TNBC had enhanced crosstalk between histone enzymes LSD1 and HDAC5 that promoted aberrant gene silencing and TNBC cell growth. Our ongoing studies demonstrated that crosstalk between LSD1 and HDAC5 may represent a novel and effective target for therapeutic target for TNBC. We further identified that sulforaphane, a natural HDAC inhibitor found in cruciferous vegetables, uniquely suppressed HDAC5 mRNA expression that facilitated LSD1 protein destabilization. Sulforaphane significantly inhibited growth in cultured breast cancer cells and MDA-MB-231 xenografts. Combined use with a novel LSD1 inhibitor, HC-2509, significantly promoted antineoplastic efficacy of sulforaphane. Moreover, microarray screening in HDAC5-KD and LSD1-KD cells identified a unique subset of genes whose expression was co-regulated by HDAC5 and LSD1 signaling pathways. These novel findings suggest that HDAC5-LSD1 axis may represent a novel and effective therapeutic target for TNBC.
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1. **INTRODUCTION**

Triple negative breast cancer (TNBC) is a more aggressive subtype of breast cancer and early distant recurrences are more common than with hormone receptor-positive counterparts. TNBC is not amenable to anti-estrogen therapy or to agents that target HER2. Therefore, new targeted approaches are urgently needed to improve TNBC therapy. Like other cancers, TNBC develops as a consequence of cumulative genetic and epigenetic changes. The epigenetic alterations include DNA methylation and histone tail modifications. Our early work suggests that enhanced crosstalk between histone enzymes LSD1 and HDAC5 promotes aberrant gene silencing and TNBC tumor cell growth. The goals of this funded proposal are to: (1) understand how changes in interaction of HDAC5 and LSD1 contribute to TNBC development; and (2) test if combined use of LSD1 and HDAC inhibitors is more efficacious in restoration of aberrantly silenced tumor suppressor genes and inhibiting tumor growth. This awarded project is a partnership between Dr. Yi Huang (initiating PI) and Dr. Nancy E. Davidson (partner PI). In the first funding year, the two labs have been working closely together, using multiple *in vitro* and *in vivo* models to decipher how to apply novel epigenetic agents in the most favorable combination strategy against TNBC and investigate how these epigenetic changes might contribute directly to TNBC tumorigenesis. The Davidson lab tested the *in vivo* therapeutic effect of a natural HDAC inhibitor (HDACi), sulforaphane, alone or in combination with LSD1 inhibitor HCI-2509 in MDA-MB-231 xenografts in mice. Moreover, the Davidson team collaborated with the Huang team on the analysis of basic mechanisms underlying how HDAC5 interacts with LSD1 complex and stabilizes its protein expression and activity in breast cancer. These new findings provided strong evidence to support our hypothesis that HDAC5-LSD1 axis represents a promising therapeutic target for improving HDACi efficacy in TNBC.

2. **KEYWORDS**

breast cancer, HDAC5, LSD1, USP28, sulforaphane, combination therapy, microarray study

3. **ACCOMPLISHMENTS**

   **a. What were the major goals of the project?**

   The hypothesis for our work is that silencing of key tumor suppressive genes by enhanced crosstalk between LSD1 and HDACs is a unique epigenetic mechanism promoting TNBC growth and metastasis, and blockade of the LSD1/HDAC axis results in profound inhibition of TNBC growth and metastasis, mediated at least in part via induction of RGS16. This is to be addressed through three specific aims:

   1. **Delineate the molecular basis by which inhibition of LSD1 promotes HDACi-induced apoptosis through reactivation of aberrantly silenced tumor suppressor genes.**
   2. **Elucidate the role of LSD1 in HDACi therapy and chemoprevention of TNBC in animal models.**
   3. **Evaluate therapeutic effects of combination strategies in patient-derived xenografts (PDXs).**

   **b. What was accomplished under these goals?**

<table>
<thead>
<tr>
<th>Proposed Aims</th>
<th>Accomplishment</th>
</tr>
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<tbody>
<tr>
<td><strong>Specific Aim 1:</strong> Delineate the molecular basis by which inhibition of LSD1 promotes HDACi-induced apoptosis through reactivation of aberrantly silenced tumor suppressor genes.</td>
<td>The Davidson team collaborated with the Huang team on the analysis of basic mechanisms underlying</td>
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HDACi-induced apoptosis through reactivation of aberrantly silenced tumor suppressor genes. how HDAC5 interacts with LSD1 complex and stabilizes its protein expression and activity in breast cancer and how HDAC5-LSD1 axis promotes breast cancer tumorigenesis.

<table>
<thead>
<tr>
<th>Major Task 1: Determine the role of LSD1/HDACs axis in promoting tumorigenic transformation of TNBC.</th>
<th>The proposed work was approved by University of Pittsburgh Institutional Review Board (PRO14030148, 3/10/2014).</th>
</tr>
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<tbody>
<tr>
<td>Subtask 1: Submit IRB approval for use of LSD1/HDAC expression plasmids. (Month 1-2)</td>
<td>These studies were carried out in Huang Lab (see Dr. Huang’s report)</td>
</tr>
<tr>
<td>Subtask 2: Establish MCF-10A cells with overexpression of LSD1, HDAC1, HDAC5 or combination. (Month 3-6)</td>
<td>We have provided Dr. Huang technical support in performing these experiments, e.g. breast cancer cell 3D culture on soft agar (see the results in Dr. Huang’s report).</td>
</tr>
<tr>
<td>Subtask 3: Treat transfected MCF-10A cells for 6 months with mutagen ICR191 and test the potential transformation of transfected MCF-10A cells in 3D culture (Month 7-15).</td>
<td></td>
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</table>

**Major Task 2: Elucidate the role of RGS16 signaling pathway in LSD1-mediated HDACi efficacy in TNBC.**

| Subtask 1: Stable knockdown of RGS16 expression in MCF-10A cells (Month 5-8). | The generation of stable MCF-10A-RGS16-KD cell line is still in progress. |
| Subtask 2: Evaluate whether silencing of RGS16 promotes MCF-10A tumorigenesis (Month 8-12). | Once the stable MCF-10A-RGS16-KD cell line is successfully generated, we will examine the effect of RGS16 inhibition on MCF-10A cell tumorigenesis. |

**Other reportable results:** To study the correlation in protein expression of HDAC5 and LSD1 in human breast cancer.

To study the potential association of HDAC5 and LSD1 in human breast cancer, we examined mRNA levels of HDAC5 and LSD1 in human immortalized normal mammary epithelial MCF10A cells, fully malignant MCF10A-CA1a cells transformed from MCF10A cells with transfection of HRAS oncogene, and several human breast cancer cell lines. qPCR studies showed that there was no clear association of mRNA expression of HDAC5 and LSD1 in breast cancer cell lines (Fig. 1A). However protein expression of both HDAC5 and LSD1 was significantly elevated in all malignant breast cell lines compared with MCF10A (Fig. 1B). Quantitative immunoblotting analysis showed that protein levels of HDAC5 and LSD1 were positively correlated (Fig. 1C). The correlation of HDAC5 and LSD1 protein expression was further evaluated in 50 primary breast cancer patient specimens by immunohistochemistry (IHC) using a commercially available tissue microarray (US Biomax, Rockville, MD). Standard staining procedure for paraffin sections was used for
IHC according to manufacturer’s recommendations (Vector Labs, Inc., Burlingame, CA). Monoclonal antibodies were used for detection of LSD1 (1:800; Cell Signaling, Danvers, MA) and HDAC5 (1:100; Santa Cruz). The staining was visualized using diaminobenzidine, and quantitated using IHC Profiler, an ImageJ plugin to calculate H-score. Chi-square study was used to assess the correlation between HDAC5 and LSD1 protein expression by using median H-scores as the cutoff for high vs low protein expression. The study showed a statistically significant correlation between HDAC5 and LSD1 protein expression in these tumors (p<0.05) (Fig. 1D). Furthermore, IHC analysis showed that breast cancer tissues (n=18) expressed significantly higher level of HDAC5 and LSD1 than their matched normal adjacent tissues (n=18) (Fig. 1E). The mean H-score for HDAC5 staining in stage 3 breast tumors (n=25) was statistically significantly higher than stage 2 counterparts (n=25). The mean H-score of LSD1 staining for stage 3 tumors was also higher than that of stage 2 tumors with a p-value of 0.07 (Fig. 1F). Taken together, these findings suggest that HDAC5 and LSD1 proteins are coordinately overexpressed in human breast cancer cell lines and tissue specimens.

Figure 1. Protein expression of HDAC5 and LSD1 is positively correlated. (A) mRNA expression of HDAC5 and LSD1 in breast cancer cell lines was compared with that of MCF10A cells as fold 1. Data are means ± SD of three independent experiments. (B) Immunoblots with anti-HDAC5 and LSD1 in indicated cell lines. (C) Histograms represent the mean protein levels of HDAC5 or LSD1 in breast cancer cell lines versus MCF10A cells (as fold 1) in three determinations. Data are means ± SD of three independent experiments. β-actin was used as control. (D) 50 primary human invasive breast tumor samples were immunostained with antibodies against HDAC5 or LSD1. Chi-square study was performed by using median H-scores as the cutoff for high vs low protein expression. (E) Representative HDAC5 and LSD1 staining (20x) in invasive breast carcinoma and adjacent normal tissue from one representative patient. H-scores represent average staining intensity in breast tumors (n=18) versus adjacent normal breast tissue (n=18). (F) Representative HDAC5 and LSD1 staining (20x) in stage 2 and 3 invasive breast carcinoma patients. H-scores represent average staining intensity in stage 3 breast tumors (n=25) versus stage 2 breast tumors (n=25). * p<0.05, ** p<0.01, *** p<0.001 (student’s t-test).
### Proposed Aims

<table>
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<tr>
<th><strong>Specific Aim 2:</strong> Elucidate the role of LSD1 in HDACi therapy and chemoprevention of TNBC in animal models.</th>
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<tr>
<td><strong>Accomplishment:</strong> The Davidson lab carried out the animal experiments and orchestrated the sample collection and analysis, histological and pathological examinations of tissues, and interpretation of the results generated from <em>in vivo</em> studies. Her team also collaborated with the Huang team on the analysis of epigenetic markers in the tissues derived from these studies.</td>
</tr>
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<tr>
<th><strong>Major Task 4:</strong> Evaluate <em>in vivo</em> therapeutic effects of combination strategies using LSD1 inhibitors and HDACi in different subtypes of breast tumors.</th>
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<tr>
<td><strong>Accomplishment:</strong> The research proposal has been approved by The University of Pittsburgh’s Institutional Animal Care and Use Committee (Protocol #: 14033448, 3/24/2014, PI: Davidson).</td>
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<tr>
<th><strong>Subtask 1:</strong> Submit documents for local IACUC review (Month 6-8).</th>
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<tr>
<td><strong>Subtask 2:</strong> Examine the <em>in vivo</em> effects of LSD1/HDAC signaling on tumorigenic transformation of MCF-10A cells (Month 8-16).</td>
</tr>
</tbody>
</table>

| **Subtask 3:** Evaluate combination strategies using LSD1i and HDACi in different subtypes of breast tumors (Month 10-26). |

- We first investigated the combinatorial effect of sulforaphane and a novel LSD1 inhibitor HCI-2509 in TNBC cells. shRNA-mediated depletion of LSD1 sensitized MDA-MB-231 cells to sulforaphane evidenced by significantly reduced IC\(_{50}\) value (*Fig. 2A*), suggesting that loss of LSD1 enhances growth inhibition by sulforaphane. Next, we investigated whether combined use of HCI-2509 with sulforaphane could lead to a synergistic effect on growth inhibition. MDA-MB-231 and MDA-MB468 cells were simultaneously treated with sulforaphane and HCl-2509. By using Chou-Talalay model, strong synergistic growth inhibition between sulforaphane and HCl-2509 was observed in both cell lines (CI<1) (*Fig. 2B*). On the basis of the above findings, we further tested the *in vivo* therapeutic effect of sulforaphane alone or in combination with HCl-2509 using MDA-MB-231 xenografts in athymic nude mice. BALB/c nu/nu athymic nude mice (Harlan Bioproducts, Indianapolis, IN) were implanted at fat pad with \(3\times10^6\) MDA-MB-231 cells. When average tumor size was > 50 mm\(^3\) (Tumor volume...
mice were randomized into control and treatment groups with the following doses: Vehicle (DMSO, n=12), sulforaphane treatment (50 mg/kg, n=12), HCI-2509 (30mg/kg, n=13), combination treatment (sulforaphane 50mg/kg, HCI-2509mg/kg, n=14). The drugs were administered by intraperitoneal (i.p.) injection 5 days/week for 4 weeks. Tumor volumes and body weights were measured every three days following the initial treatment and continued throughout the course of the study. Treatment with either sulforaphane or HCI-2509 alone significantly inhibited growth of MDA-MB-231 xenografts. Combined treatment with both compounds exhibited statistically significantly greater inhibitory effect on tumor growth than either therapy alone (Fig. 3A & 3B). During the course of treatment, there was no obvious weight loss observed in groups treated with sulforaphane or HCI-2509 alone, except a moderate decrease of weight (<10% of body weight) in the group treated with both compounds. No animals died from treatment (Fig. 3C). These results indicate that sulforaphane effectively inhibits growth of TNBC tumor in vivo and is more effective when used in combination with an LSD1 inhibitor. 

![Figure 2. LSD1 inhibitor sensitizes breast cancer cells to sulforaphane-induced growth inhibition.](image)

(A) Scramble or LSD1-shRNA transfected MDA-MB-231 cells were treated with 25 μM sulforaphane followed by crystal violet assays. (B) Effect of combination therapy on growth. Synergy was defined as any CI < 1. Data are means ± SD of three independent experiments. ** p<0.01, student’s t-test.

![Figure 3. LSD1 inhibitor sensitizes breast cancer cells to sulforaphane-induced growth inhibition.](image)

(A) Tumor volumes of mice measured twice weekly. The vertical bars indicate mean tumor size (in mm3)±SE. (B) Weight of animal tumors was measured at the end of experiment. (C) Weights of mice were measured in the indicated days. The vertical bars represent mean mouse weight±SE** p<0.01, *** p<0.001 (student’s t-test).
c. What opportunities for training and professional development has the project provided?

This award provides an excellent vehicle for a postdoctoral fellow, Chunyu Cao, PhD, who has worked on this project to advance his breast cancer research career and transition to independence.

d. How were the results disseminated to communities of interest?

The progress of this work was presented by Dr. Cao at the 2015 annual meeting of American Association of Cancer Research (AACR): Cao C, Vasilatos S, Oesterreich S, Davidson NE, Huang Y. Functional crosstalk between histone deacetylase 5 (HDAC5) and lysine-specific demethylase 1 (LSD1) as a novel therapeutic target in triple-negative breast cancer cells. The 106th AACR Annual Meeting, Philadelphia PA, Cancer Res, Abstract 3838, 2015.

This work was also presented by Dr. Cao at 27th Annual University of Pittsburgh Cancer Institute Scientific Retreat in June, 2015 as well as the Women’s Cancer Research Center Annual retreat at the University of Pittsburgh in October, 2015.

One manuscript has been submitted to Oncogene for publication and it is currently under revision.

What do you plan to do during the next reporting period to accomplish the goals?

During the next reporting period we will continue to elucidate how sulforaphane suppresses HDAC5-LSD1 signaling and alters chromatin structures in TNBC. We will clarify the mechanism of sulforaphane-induced downregulation of HDAC5 transcription, and examine how sulforaphane inhibit LSD1-USP28 interaction through downregulation of HDAC5 expression. Finally we will acquire or generate HDAC5 transgenic/knockout mouse models to validate our hypothesis that HDAC5-LSD1 axis represents a promising therapeutic target for TNBC.

4. IMPACT

(a) What was the impact on the development of the principal discipline(s) of the project?

TNBC comprises those breast cancers that lack expression of estrogen receptor (ER), progesterone receptor (PR), and HER-2 protein. Clinically, TNBC is more aggressive and distant recurrences in visceral organs are more common in TNBC patients than their hormone receptor-positive counterparts. Our studies have opened a new avenue for the potential utility of crosstalk between HDAC5 and LSD1 as a new therapeutic target in TNBC. Our work addresses an important research area that has been understudied in invasive breast cancer. As epigenetic therapies are currently being clinically tested, our new strategy using a natural HDAC inhibitor and a novel LSD1 inhibitor has great potential to be rapidly translated into clinical trials. The information derived from our newly completed microarray study reported in the Huang progress report will likely identify a new panel of aberrantly silenced tumor suppressor genes targeted by HDAC5/LSD1 axis that has the potential to serve as a novel panel of biomarkers to predict response or resistance to epigenetic therapy in TNBC.

(b) What was the impact on other disciplines? Nothing to Report

(c) What was the impact on technology transfer? Nothing to Report

5. CHANGES/PROBLEMS
(a) Changes in approach and reasons for change

No major changes in approach have been made since the initiation of the award.

(b) Actual or anticipated problems or delays and actions or plans to resolve them

Nothing to Report

(c) Changes that had a significant impact on expenditures

Nothing to Report

(d) Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

The natural HDAC inhibitor sulforaphane and novel LSD1 inhibitor HCI-2509 have been added as new agents to study their ability in targeting HDAC5-LSD1 axis in breast cancer. We will obtain approval to extend our findings to human tissues.

6. PRODUCTS

(a) Publications, conference papers, and presentations


(b) Website(s) or other Internet site(s) Nothing to Report

(c) Technologies or techniques Nothing to Report

(d) Inventions, patent applications, and/or licenses Nothing to Report

(e) Other Products Nothing to Report

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

a) Individuals have worked on the project

<table>
<thead>
<tr>
<th>Name</th>
<th>Nancy Davidson</th>
<th>Yi Huang</th>
<th>Chunyu Cao</th>
<th>Shauna Vasilatos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Role</td>
<td>Co-PI</td>
<td>Co-PI</td>
<td>Postdoc Fellow</td>
<td>Technician</td>
</tr>
<tr>
<td>Researcher Identifier (e.g. ORCID ID):</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Nearest person month worked:</td>
<td>1.2</td>
<td>3.6</td>
<td>6.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Contribution to Project:</td>
<td>Oversaw IHC studies and animal experiments, and interpreted the results generated from <em>in vivo</em> studies</td>
<td>Designed and oversaw the studies to define in depth the basic mechanisms and biological consequences of the functional interplay between HDAC5/LSD1 in breast cancer</td>
<td>Studied molecular mechanisms by which LSD1 and HDAC interacted, and carried out animal study</td>
<td>Performed IHC and microarray studies, oversaw critical lab management activities</td>
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<tr>
<td>Funding Support:</td>
<td>CDMRP Breast Cancer Breakthrough Award and Breast Cancer Research Foundation</td>
<td>CDMRP Breast Cancer Breakthrough Award and Breast Cancer Research Foundation</td>
<td>CDMRP Breast Cancer Breakthrough Award</td>
<td>CDMRP Breast Cancer Breakthrough Award</td>
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b) Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Dr. Tiffany Katz completed her postdoctoral fellow training, and Dr. Chunyu Cao joined the laboratory carry out the studies.

c) What other organizations were involved as partners?

Nothing to Report

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: Initiating PI, Dr. Yi Huang, will submit his annual report separately.

QUAD CHARTS: N/A

9. APPENDICES: updated curriculum vitae is attached
Name: Nancy Ellen Davidson, MD

Business Address:
University of Pittsburgh Cancer Institute
University of Pittsburgh
UPMC Cancer Pavilion
5150 Centre Avenue, Suite 500
Pittsburgh, PA 15232

EDUCATION and TRAINING

UNDERGRADUATE:
1975 BA, Wellesley College, Wellesley, Massachusetts

GRADUATE:
1979 Harvard Medical School, Boston, Massachusetts

POSTGRADUATE:
1979-1980 Intern, Internal Medicine, Hospital of the University of Pennsylvania
Philadelphia, Pennsylvania
1980-1982 Resident, Internal Medicine, The Johns Hopkins Hospital
Baltimore, Maryland
1982-1985 Medical Staff Fellow, National Cancer Institute,
    National Institutes of Health, Bethesda, Maryland

January 2016
**APPOINTMENTS and POSITIONS**  
**ACADEMIC: (Institutional)**

1985-1987  
Guest Worker  
Medical Breast Cancer Section, Medicine Branch, National Cancer Institute  
Bethesda, Maryland

1985-1986  
Research Assistant Professor of Pharmacology  
Uniformed Services University of Health Sciences  
Bethesda, Maryland

1986-1992  
Assistant Professor of Oncology  
The Johns Hopkins University School of Medicine  
Baltimore, Maryland

1992-1999  
Associate Professor of Oncology  
The Johns Hopkins University School of Medicine  
Baltimore, Maryland

1995-2009  
Breast Cancer Research Chair of Oncology,  
The Johns Hopkins University School of Medicine  
Baltimore, Maryland

1999-2009  
Professor of Oncology  
The Johns Hopkins University School of Medicine  
Baltimore, Maryland

1986-2009  
Active Staff, Johns Hopkins Hospital  
Baltimore, Maryland

1994-2009  
Director, Breast Cancer Program  
The Johns Hopkins Oncology Center  
Baltimore, Maryland

1997-2009  
Joint Appointment in Department of Biochemistry and Molecular Biology  
The Johns Hopkins Bloomberg School of Public Health

2009-  
Adjunct Professor of Oncology, The Johns Hopkins University School of Medicine  
Baltimore, Maryland

2009-2010  
Chief, Division of Hematology/Oncology  
University of Pittsburgh School of Medicine  
Pittsburgh, PA

2009-  
Director, University of Pittsburgh Cancer Institute and UPMC CancerCenter  
Professor of Medicine and Pharmacology and Chemical Biology  
Associate Vice Chancellor for Cancer Research  
Hillman Professor of Oncology  
University of Pittsburgh, PA

2010-  
Professor, Clinical and Translational Science Institute

2013-  
Distinguished Professor of Medicine
CERTIFICATION AND LICENSURE

SPECIALTY CERTIFICATION:
Certifying Board | Year
--- | ---
National Board of Medical Examiners | 1980
American Board of Internal Medicine | 1982
Medical Oncology | 1985

Medical or other Professional Licensure:
State of Maryland | 1982
Commonwealth of Pennsylvania | 2009

MEMBERSHIPS IN PROFESSIONAL SCIENTIFIC SOCIETIES

SOCIETIES

1985-present | American Society of Clinical Oncology
--- | ---
1992, 1998, 2002-3 | Member, Program Committee
1992-1996 | Member, Public Issues Committee
1992-1996 | Member, Award Selection Committee
1994-1995 | Chair, Award Selection Committee
1993-1994 | Member, Ad hoc Technology Assessment Committee for Development of Growth Factor Clinical Practice Guidelines
1996-present | Co-Chair, Breast Cancer Follow-up Testing Guidelines Expert Panel
1997-1999 | Member, Membership Committee
1996-1999 | Member, Board of Directors
1999-2002 | Member, Grants Selection Committee
1999-2004 | Member, Task Force on Quality of Cancer Care
2004-2007 | Member, Publications Committee
2005-2006 | Chair, Publications Committee
2005-2006 | Member, Translational Research Task Force
2006-2009 | President-Elect, President, and Immediate Past President
2007-present | Member, Value in Cancer Care Task Force
2008-2009 | Chair, Special Awards Selection Committee
2008-2009 | Member, Translational Research Professorship Selection Committee
2013-2015 | Government Relations Committee
2010-2014 | By-laws Committee, Chair 2012-14

1988-present | American Association for Cancer Research
--- | ---
1993-1997 | Member, Maryland Legislative Committee
2000-2001, 2002-2003 Member, Program Committee
2003 Co-Chair, Program Committee
2001 Member, Clinical Cancer Research Committee
1998-1999, 2001-2003 Member, AACR-Richard and Hinda Rosenthal Foundation Award Selection Committee
2002-2005 Member, Board of Directors
2003-2004 Chair, Education Committee
2004-2005 Member, Grants Selection Committee
2004-2005 Member, Lifetime Achievement Award Selection Committee
2005-2006 Member, Landon Award Selection Committee
2008-2009 Chair, AACR-Breast Cancer Research Foundation Grants Selection Committee
2008-2009 Member, Landon Translational Award Selection Committee
2008 Co-Chair, Program Committee, 7th Annual Frontiers in Cancer Prevention Research Conference
2010-2012 Member and Chair (2010-11), AACR Nominating Committee
2010-present Member, Continuing Medical Education Committee, (Chair 2015-)
2012-2013 Member, Education Committee
2011-2014 Member, Program Committee, AACR-San Antonio Breast Cancer Symposium
2015-2018 President-Elect, President, and Immediate Past President

1987-present Eastern Cooperative Oncology Group
1987-present Member, Breast Cancer Core Committee
1992-1996 Chair, Breast Cancer Biology Committee
1992-1996 Co-Chair, Breast Cancer Committee
1997-2002 Chair - Breast Cancer Committee

2009-present American College of Physicians
Member

2010-present Member, National Surgical Adjuvant Bowel and Breast Project
2010-2013 Member, Board of Directors, Association of American Cancer Institutes
2015- Member, Association of American Physicians Council

HONORS
1974 Phi Beta Kappa
1975 Sigma X
1986-1987 American Society of Clinical Oncology Young Investigator Award
1987-1988 Susan Komen Foundation Award
1988-1991 American Cancer Society Clinical Oncology Career Development Award
1989-1990 Merck Clinician Scientist Award
1995-2009 Breast Cancer Research Chair in Oncology, Johns Hopkins
1998  ACS Research Award, American Cancer Society - Maryland Division
1999  Brinker International Award for Breast Cancer Research
2000  Wellesley College Alumnae Achievement Award
2001  William L. McGuire Memorial Lectureship, 24th Annual San Antonio Breast 
      Cancer Symposium
2003  Avon Foundation Medical Advancement Award
2007-8 President, American Society of Clinical Oncology
2008  7th Rosalind E. Franklin Award for Women in Science, National Cancer Institute
2008  11th American Association for Cancer Research-Women in Cancer Research 
      Charlotte Friend Award
2009  Johns Hopkins University Alumni Association Distinguished Alumna Award
2010  American Society of Clinical Oncology Gianni Bonadonna Breast Cancer Award
2010  Association of American Physicians
2011  National Academy of Medicine (formerly the Institute of Medicine)
2012  Pennsylvania Breast Cancer Coalition Potamkin Award
2013  Distinguished Professor of Medicine, University of Pittsburgh.
2014  Thomson Reuters Highly Cited Researchers 2014
2015  The Johns Hopkins Women’s Medical Alumnae Association Hall of Fame
2016  Fellow, American College of Physicians

Publications

Articles Published in Professional Journals
1. Kensler TW, Busby WF, Jr., Davidson NE, and Wogan GN. Aflatoxin inhibition of 
glucocorticoid binding capacity of rat liver nuclei. Biochim. Biophys. Acta 473:200-10, 
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2. Kensler TW, Busby WF, Davidson NE, and Wogan GN. Effect of hepatocarcinogens on the 
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7 cell variants to evaluate the growth regulatory potential of estrogen-induced products.  
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Bronzert D, Bates S, Swain S and Knabbe C. Autocrine and paracrine growth regulation of 


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resonance imaging spectroscopy and multinuclear (23Na) imaging monitoring of preoperative chemotherapy for locally advanced breast cancer. Acad Radiol 17:1477-85, 2010. PMC3401079

217. Davidson, NE. HER2-targeted therapies: how far we’ve come—and where we’re headed. Oncology 25(5):425-6, 2011. PMID 21710840

218. Davidson, NE. Retrospective on the last quarter-century in medical oncology. Oncology 25(5):396, 2011. PMID 21710831


Perez EA, Dueck AC, McCullough AE, Reinholz MM, Tenner KS, Davidson NE, Gralow J, Harris LN, Kutteh LA, Hillman DW, Jenkins RB, Chen B. Predictability of adjuvant


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257. Moreno-Aspitia A, Hillman DW, Dyer SH, Tenner KS, Gralow J, Kaufman PA, Davidson NE, Lafky JM, Reinholz MM, Lingle WL, Kutteh LA, Carney WP, Dueck AC, Perez EA. Soluble human epidermal growth factor receptor 2 (HER2) levels in patients with HER2-positive breast cancer receiving chemotherapy with or without trastuzumab: Results from


Editorials

11. Park BH and Davidson NE. Estrogen receptor status, cell cycling and paclitaxel looking for a "hormone"-ious explanation. Cancer Biology & Therapy 3:468-9, 2004

31

Articles in the Lay Press
2. Davidson NE. Hormone replacement therapy in perspective; Medical and Health Annual, Encyclopedia Britannica, Inc., Chicago, IL pp. 361-6, 1997.

Book Reviews

Books Edited


Book Chapters
17. Ferguson AT, Lapidus RG and Davidson NE. The regulation of estrogen receptor expression and function in breast cancer. In: Biological and Hormonal Therapies of


Professional activities

TEACHING:
1988-2005 Lecturer, Pathophysiology Course for 2nd Year Medical Students
1991 Medical Student Advisor
1996-2009 Lecturer, Fundamentals of Clinical Oncology for Public Health Practitioners
1997-2009 Lecturer, Topics in Molecular Endocrinology, School of Public Health
2004-2009 Lecturer, Pathophysiology of Disease, Cellular and Molecular Medicine
2009-present Lecturer, Cancer Biology and Therapy

Mentoring
Postdoctoral Fellows – Laboratory

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>1988-1990</td>
<td>M. John Kennedy, MD</td>
<td>Consultant, St. James Hospital, Dublin, Ireland</td>
</tr>
<tr>
<td>1993-1997</td>
<td>Rena Lapidus, PhD</td>
<td>Assistant Professor, University of Maryland</td>
</tr>
<tr>
<td>1993-1998</td>
<td>Anne Ferguson, PhD</td>
<td>Non-profits, San Francisco, CA</td>
</tr>
<tr>
<td>1994-1995</td>
<td>Christian Jackisch, MD</td>
<td>Chief, Clinic for Gynecology and Obstetrics, Klinikum Offenbach, Offenbach, Germany</td>
</tr>
<tr>
<td>1996-1999</td>
<td>Hillary Hahm, MD, PhD</td>
<td>Private Practice, Atlanta, GA</td>
</tr>
<tr>
<td>1997-1999</td>
<td>Sharyl Nass, PhD</td>
<td>Policy Analyst, Institute of Medicine, Washington, DC</td>
</tr>
<tr>
<td>1998-2001</td>
<td>Xiaowei Yang, MD, PhD</td>
<td>Staff Scientist, National Cancer Institute</td>
</tr>
<tr>
<td>1999-2001</td>
<td>Valerie Dunn, MD</td>
<td>Private Practice, Rochester, NY</td>
</tr>
</tbody>
</table>
2000-2001  Lan Yan, MD, PhD  Staff Scientist, Amgen, Thousand Oaks, CA
2001-2006  Yi Huang, MD, PhD  Assistant Professor, University of Pittsburgh, Pittsburgh, PA
2001-2004  Judith C. Keen, PhD  National Breast Cancer Coalition, Washington DC
2002-2003  Dipali Sharma, PhD  Associate Professor of Oncology, Johns Hopkins University School of Medicine, Baltimore, MD
2004-2006  Qun Zhou, MD, PhD  Associate Professor of Biochemistry and Molecular Biology, University of Maryland Medical School
2005-2006  Allison Tracy, PhD  Lecturer of Chemistry and Biochemistry, UMBC
2006-2009  Qingsong Zhu, PhD  Chief Operating Officer, In Silico Medicine, Inc.
2006-2009  Madhavi Billam, PhD  Senior Toxicologist, L’Oreal USA & RI
2011-2013  Tiffany Katz, PhD  Postdoctoral Associate, University of Pittsburgh
2014-present  Nilgun Tasdemir, PhD  Postdoctoral Fellow, University of Pittsburgh

Doctoral Students
2000-2005  Julie Blum, PhD  Clinical Content Manager, MED-IQ
2001-2005  Allison Pledgie, PhD  Senior Lecturer in Chemistry and Biochemistry at University of Maryland Baltimore County (UMBC)
2004-2010  Abigail Witt, PhD  Postdoctoral Fellow, University of Miami School of Medicine
2005-2010  Talmesha Richards, PhD  Chief Academic and Diversity Officer at STEMconnector
2006-2010  Patrick Shaw, PhD  Chief, Pathogen Detection Lab. USA Public Health Command Region-Pacific Camp Zama, Japan

Graduate Training Programs
1997-2011  Biochemistry and Molecular Biology, Hopkins Bloomberg School of Public Health (adjunct 2009-2011)
1999-2013  Cellular and Molecular Medicine, Hopkins School of Medicine (adjunct 2009-2013)

RESEARCH:

1. CURRENT GRANT SUPPORT:

Grants Awarded as Principal Investigator
2009-  NIH P30CA047904. Cancer Center Support Grant
1998-  Breast Cancer Research Foundation
1a. PRIOR GRANT SUPPORT

Grants Awarded as Principal Investigator

- 1986-1987 American Society of Clinical Oncology Young Investigator Award, "Isolation of estrogen-induced genes from human breast cancer."
- 1989-1990 Merck Clinician Scientist Award, Johns Hopkins University School of Medicine.
- 1990-1991 Johns Hopkins University School of Medicine Institutional Research Grant, "Elimination of breast cancer cells from human bone marrow by counterflow centrifugal elutriation".
- 1994-1998 NIH Grant R21 CA/ES 66204 "Development of a breast cancer program at Johns Hopkins".
- 1995-1999 NIH Grant 1 U01 CA66084. "New therapeutic approaches for breast cancer".
- 1998-2004 NIH Grant R01 CA78352 “DNA methylation as a determinant of hormone resistant breast cancer.”
2001-2009  Avon Foundation
2001-2005  Susan G. Komen Foundation Postdoctoral Fellowship
2003-2005  Susan G. Komen Foundation Predoctoral Fellowship
2000-2009  American Breast Cancer Foundation
2006-2008  Susan G. Komen Foundation, BCTR 65706, “Polyamine analogues as novel anti-estrogen receptor alpha agents
2008-2011  Susan G. Komen for the Cure, KG080923, Inhibition of lysine specific demethylase 1 (LSD1) as a strategy for re-expression of epigenetically silenced genes in breast cancer Robert Casero, Jr. and Nancy E. Davidson (Co-PIs)
2000-2013  NIH P50 CA88843. SPORE in Breast Cancer (co-PI of University of Pittsburgh site 2009-2012)
2011-2013  Gynecologic Center of Excellence. Henry M. Jackson Foundation
2009-2013  Stand up to Cancer (AACR). Bringing epigenetic therapy to the forefront of cancer. (Dream Team Principal with Stephen Baylin and Peter Jones)

2. Seminars and Invited Lectureships

Invited Seminars

1985  Grand Rounds, Washington Veterans Administration Hospital, Washington, DC
1986  Medical Grand Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
      Symposium on Breast Cancer, Millville Hospital, Vineland, NJ
      Department of Hematology-Oncology, University of Missouri, Kansas City, MO
      Kansas City Round Table of Hematology/Oncology, Kansas City, MO
      American Association of Osteopathic Internists, Washington, DC
      Cincinnati Cancer Conference V, Cincinnati, OH
      Advances in Oncology, Cherry Hill, NJ
1987  13th Annual Symposium on Diagnosis and Treatment of Neoplastic Disorders Course, Johns Hopkins Medical Institutions, MD
      Breast Cancer Session, Eastern Cooperative Oncology Group, Clearwater, FL
1988  Early Breast Cancer Conference, Memorial Hospital, Colorado Springs, CO
      Grand Rounds, Liberty Medical Center, Baltimore, MD
      Medical Grand Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
      Annual Hematology/Oncology Conference, The Medical Center of Delaware, Wilmington, DE
      Department of Medicine Professors Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
      Medical Residents Journal Club, Johns Hopkins Medical Institutions, Baltimore, MD
      Plastic Surgery Grand Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
1989  Department of Medicine Bench to Bedside, Johns Hopkins Medical Institutions, Baltimore, MD
Twelfth Annual Symposium on Current Concepts in Medicine and Surgery, Peninsula General Hospital, Salisbury, MD
Topics in Internal Medicine Course, Johns Hopkins Medical Institutions, Baltimore, MD
15th Annual Symposium on Diagnosis and Treatment of Neoplastic Disorders, Johns Hopkins Medical Institutions, Baltimore, MD
Eleventh Annual Cancer Symposium Selected Topics in Oncology, Raleigh, NC
Plastic Surgery Grand Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
St. George's Society, Johns Hopkins Medical Institutions, Baltimore, MD
Hematology-Oncology Division Seminar, Indiana University School of Medicine, Indianapolis, IN

1990  Grand Rounds, St. Agnes Hospital, Baltimore, MD
Department of Medicine Bench to Bedside, Johns Hopkins Medical Institutions, Baltimore, MD
American Cancer Society, Maryland Division, Baltimore, MD
Medical Grand Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
16th Annual Symposium on Diagnosis and Treatment of Neoplastic Disorders, Johns Hopkins Medical Institutions, Baltimore, MD
NCI Strategy Meeting on High Dose Chemotherapy in Breast Cancer, National Cancer Institute, Bethesda, MD
Hematology-Oncology Division Seminar, University of Maryland School of Medicine, Baltimore, MD

1991  Hematology-Oncology Conference, Chester Hospital, West Chester, PA
Department of Medicine Professors Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
Symposium on Early Breast Cancer, Montgomery General Hospital, Olney, MD
Hematology-Oncology Division Seminar, Northwestern University School of Medicine, Chicago, IL
Pennsylvania Oncology Society, Gettysburg, PA
Susan G. Komen Foundation Scientific Symposium, University of Texas - Southwestern Medical School. Dallas, TX

1992  Breast Cancer Symposium, Crozer-Chester Hospital, Upland, PA
Hematology-Oncology Grand Rounds, University of Maryland School of Medicine, Baltimore, MD
Department of Medicine Ambulatory Care Rounds, Johns Hopkins Medical Institutions, Baltimore, MD
Staff Conference, Roswell Park Cancer Institute, Buffalo, NY
Tumor Board, Anne Arundel Hospital, Annapolis, MD
18th Annual Symposium on the Diagnosis and Treatment of Neoplastic Disorders, Johns Hopkins Medical Institutions, Baltimore, MD
Hopkins Medical Institutions, Baltimore, MD
American Cancer Society, Teaneck, NJ
Australia - New Zealand Breast Cancer Trials Group, Surfers Paradise, Australia
Laboratory of Biologic Chemistry, National Cancer Institute, Bethesda, MD
Lederle Advisory Board, New York City, NY
Gordon Conference on Cancer, Newport, RI
American Society of Clinical Pathologists, Las Vegas, NV
The Cancer Center at Fairfax Hospital, Fairfax, VA
American Fertility Society, New Orleans, LA
Visiting Professor, Department of Medicine, Hahnemann University School of Medicine, Philadelphia, PA

1993
NCI Strategy Meeting on Breast Cancer in Young Women, National Institutes of Health, Bethesda, MD
St. Georges Society, University of Maryland School of Medicine, Baltimore, MD
US-Japanese Joint Scientific Meeting on New Breast Cancer Therapies, Oakland, CA
Isaac Lewin Symposium, Baystate Medical Center, Springfield MA
Discussant, Adjuvant Breast Cancer Session, American Society of Clinical Oncology, Orlando, FL
Educational Session, National Cancer Institute Phase I Meeting, Bethesda, MD
Working Group on the Pulmonary Complications Associated with Breast Cancer Therapy, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD
Shanghai Cancer Institute, Shanghai, Peoples Republic of China
Ethics and Politics in Clinical Trials, Johns Hopkins Medical Institutions, Baltimore, MD
NCI Workshop on Prognostic and Predictive Factors in Breast Cancer, Bethesda, MD

1994
Hematology/Oncology Grand Rounds, Wayne State University School of Medicine, Detroit, MI
Clinical Oncology Program Grand Rounds, National Cancer Institute, Bethesda, MD
NCI Strategy Meeting on High Dose Chemotherapy for Breast Cancer, Bethesda, MD
11th Annual Advances in Cancer Treatment Research, Albert Einstein College of Medicine, New York City, NY
Recent Advances in the Biology of Breast, Colon, and Lung Cancer, American Society of Clinical Oncology, Dallas, TX
Discussant, Plenary Session, American Society of Clinical Oncology, Dallas, TX
Women's Health Seminar Series, Breast Cancer, National Institutes of Health, Bethesda, MD
Chemotherapy Symposium, Berlex Oncology Foundation, Leesburg, VA
The State of Breast Cancer 1994: An Interactive Symposium, University of California at San Francisco, San Francisco, CA
Grand Rounds, Washington County Hospital, Hagerstown, MD
Y-ME of the Cumberland Valley, Hagerstown, MD
1995 Department of Pharmacology and Toxicology, Robert C. Byrd Health Sciences Center of West Virginia University, Morgantown, WV
12th Annual International Breast Cancer Conference, Miami, FL
Controversy Session, American Association for Cancer Research, Toronto, Canada
Department of Pharmacology, Mayo Clinic, Rochester, MN
Susan G. Komen Foundation Congressional Breakfast, Washington, DC
Commonwealth of Massachusetts Course on Breast Cancer, Boston, MA
Law and Health Care Program, University of Maryland and Baltimore School of Law, Baltimore, MD
Discussant, Breast Cancer Session, American Society of Clinical Oncology, Los Angeles, CA
Topics in Clinical Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
Gordon Research Conference on Mammary Gland Biology, New London, NH
The Endocrine Society’s 51st Conference on Recent Progress in Hormone Research, Stevenson, WA
Eighteenth Thomas W. Green Memorial Lecture, East Tennessee State University James H. Quillen College of Medicine, Bristol, TN
Fifth International Congress on Hormones and Cancer, Quebec City, Canada
Cancer Medicine, Harvard Medical School, Boston, MA
Medical Oncology Board Review, George Washington University School of Medicine, Washington, DC
The First Annual Kimmel-Slavin Memorial Lecture, George Washington University School of Medicine, Washington, DC
Chemotherapy Symposium, Berlex Oncology Foundation, Leesburg, VA
Meet the Professor, American Society of Clinical Oncology Fall Educational Conference, Washington, DC
Grand Rounds, Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
Division of Hematology/Oncology, Washington Hospital Center, Washington, DC
18th Annual San Antonio Breast Cancer Symposium, San Antonio, TX
Department of Medicine, St. Joseph Hospital, Baltimore, MD
Dana-Farber Cancer Institute, Boston, MA
22nd Annual Symposium on the Diagnosis and Treatment of Neoplastic Disorders, Johns Hopkins

1996 Department of Embryology, Carnegie Institute of Washington, Baltimore, MD
Mayo Clinic Cancer Center, Rochester, MN
New Approaches to Cancer Therapy, The Johns Hopkins Oncology Center, Baltimore, MD
Topics in Clinical Medicine, Johns Hopkins University School of Medicine, Baltimore, MD

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University of Maryland Cancer Center, Baltimore, MD
Discussant, Breast Cancer Session, American Society of Clinical Oncology, Philadelphia, PA
Bowman Gray Comprehensive Cancer Center, Wake Forest University, Winston-Salem, N.C.
American College of Surgeons, San Francisco, CA
Session Chair, Gordon Conference on Cancer Chemotherapy, Oxford, UK
Chemotherapy Symposium, Berlex Oncology Foundation, Leesburg, VA
City of Hope National Medical Center, Duarte, CA
Upstate New York Cancer Research and Education Foundation, Syracuse, NY
Wendy and Emery Reeves International Breast Cancer Symposium, University of Texas Southwestern
Medical Center, Dallas, TX 30th Anniversary Symposium, National Institute of Environmental Health Sciences, Research Triangle, NC
Meet the Professor, American Society of Clinical Oncology Fall Educational Conference, Phoenix, AZ
Maryland Cancer Control Symposium, Baltimore, MD
Lombardi Cancer Center, Georgetown University Medical Center, Washington, DC
Department of Biochemistry, Johns Hopkins School of Hygiene and Public Health, Baltimore, MD

1997
Breast Cancer Think Tank 7, St. Lucia
4th Annual Breast Cancer Symposium of the New York Metropolitan Breast Cancer Group, New York City, NY
2nd Annual Multidisciplinary Symposium on Breast Disease, Amelia Island, FL
University of Colorado Cancer Center, Denver, CO
Cambridge Symposium, Genetic Approaches to Breast and Prostate Cancer, Lake Tahoe, CA
St. George’s Society, University of Maryland Medical School, Baltimore, MD
Issues in the Treatment of Breast Cancer, Greater Baltimore Medical Center, Baltimore, MD
University of Chicago Cancer Center, Chicago, IL
Conjoint Clinic, Johns Hopkins University School of Medicine, Baltimore, MD
Breast Cancer Tumor Panel, American Society of Clinical Oncology, Denver, CO
Pittsburgh Cancer Institute, University of Pittsburgh Medical School, Pittsburgh, PA
International Cancer Alliance, Washington, DC
Perspectives in Breast Cancer, Emory University, Atlanta, GA
US Public Health Services Office on Women’s Health Healthy Women 2000, Washington, DC
Chemotherapy Symposium, Berlex Oncology Foundation, Leesburg, VA
American College of Surgeons, Chicago, IL
Susan G. Komen Foundation Breast Cancer Symposium, Dallas, TX
Medical Oncology Board Review, George Washington University School of Medicine, Washington, DC
Case Western Reserve University/Ireland Cancer Center, Cleveland, OH
Holy Cross Hospital, Silver Spring, MD
Department of Medicine and Cancer Center, University of California at San Francisco, San Francisco, CA
American Society of Clinical Oncology Fall Education Conference, Orlando, FL
14th Annual American College of Physicians/Amy Regional Meeting, Reston, VA
Fallston Hospital, Fallston, MD

1998
Breast Cancer Think Tank 8, Tobago
Session Co-Chair, 6th International Conference on Adjuvant Therapy of Primary Breast Cancer, St. Gallen, Switzerland
Controversy Session Chair, American Association for Cancer Research, New Orleans, LA
24th Annual Symposium on Diagnosis and Treatment of Neoplastic Diseases, Johns Hopkins Medical Institutions, Baltimore, MD
Breast Cancer Symposium, Inova Fairfax Hospital, Fairfax, VA
Discussant, Plenary Session, American Society of Clinical Oncology, Los Angeles, CA
Department of Pathology, Vanderbilt School of Medicine, Nashville, TN
Suburban Hospital, Bethesda, MD
Department of Medicine, Columbia-Presbyterian Medical Center, New York City, NY
Gordon Conference on Cancer, Newport, RI
Chemotherapy Symposium, Berlex Oncology Foundation, Leesburg, VA
2nd Annual Advances in Cancer Therapy, VCU/MCV, Richmond, VA
Kent and Queen Anne’s Hospital, Chestertown, MD
Breast Cancer Awareness Month, The White House Washington, DC
Medical Oncology Board Review, George Washington University School of Medicine, Washington, DC
21st Annual San Antonio Breast Cancer Symposium, San Antonio, TX

1999
Breast Cancer Think Tank 9, St. Thomas, Virgin Islands
Joint Cancer Conference of the Florida Universities, Orlando, FL
Grand Rounds, Department of Medicine, Johns Hopkins Medical Institutions, Baltimore, MD
Congressionally Directed Medical Research Programs, Frederick, MD
Topics in Internal Medicine, Department of Medicine, Johns Hopkins, Baltimore, MD
American Society of Clinical Oncology, Atlanta, GA
1st Milan Breast Cancer Conference, Milan, Italy
Johns Hopkins Singapore, Singapore
Grand Rounds, Department of Surgery, Northwest Hospital, Baltimore, MD
6th Nottingham International Breast Cancer Conference, Nottingham, England
Seeking Excellence in Breast Cancer Care: Best Practices in Diagnosis and Treatment,
Johns Hopkins University School of Medicine, Baltimore, MD
First Annual Lynn Sage Breast Cancer Symposium, Robert H. Lurie Comprehensive
Cancer Center of Northwestern University, Chicago, IL
Chemotherapy Symposium, Berlex Oncology Foundation, Leesburg, VA
Cancer Medicine, Harvard Medical School, Boston, MA
41st Annual Meeting of the American Society of Therapeutic and Radiation Oncology,
San Antonio, TX
SERMs - Implication for Prevention and Treatment of Cancer, Philadelphia, PA
American Society of Clinical Oncology Fall Education Conference, San Francisco, CA
Genetics Program, University of Missouri, Columbia, MO
22nd Annual San Antonio Breast Cancer Symposium, San Antonio, TX

2000 Sibley Hospital, Washington, DC
Franklin Square Hospital, Baltimore, MD
Molecular Biology of Breast Cancer, Lillehammer, Norway
Keystone Symposium in Advances in Human Breast and Prostate Cancer, Lake Tahoe,
NV
NIH Workshop on Selective Estrogen Receptor Modulators (SERMs), Bethesda, MD
Topics in Internal Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
National Breast Cancer Coalition Eighteenth Annual Advocacy Training Conference
2nd Milan Breast Cancer Conference, Milan, Italy
Australia - New Zealand Breast Cancer Trials Group, Queenstown, New Zealand
Suburban Hospital, Bethesda, MD
15th Annual Excalibur Round Table, American Cancer Society, Baltimore, MD
Susan G. Komen Breast Cancer Foundation National Symposium - Reaching for the
Cure..... Making a Difference, Washington, DC
WellStar Kennestone Hospital, Marietta, GA
WellStar Cobb Hospital, Marietta, GA
Hematology-Oncology Board Review, George Washington University School of
Medicine, Arlington, VA
Berlex Oncology Foundation Clinical Pharmacology of Anticancer Drugs, Leesburg, VA
42nd Annual Meeting of the American Society of Therapeutic and Radiation Oncology,
Boston, MA
National Institutes of Health Consensus Development Conference on Adjuvant Therapy
of Breast Cancer, Bethesda, MD
Seeking Excellence in Breast Cancer Care, Johns Hopkins University School of Nursing
and School of Medicine, Baltimore, MD

2001 Breast Cancer Think Tank 11, Punta Cana, Dominican Republic Potential Clinical
Applications for GnRH Agonists, National Institutes of Health, Bethesda, MD
7th International Conference on Adjuvant Therapy of Primary Breast Cancer, St. Gallen, Switzerland
8th Annual Miami Breast Cancer Conference, Miami, FL
Central Pennsylvanina Oncology Group, Harrisburg, PA
Mary E. Humphreys Biology Lecture, Mary Baldwin College, Staunton, VA
Department of Medicine Grand Rounds, Johns Hopkins Bayview, Baltimore, MD
Discussant, American Society of Clinical Oncology, San Francisco, CA
Anne Arundel Medical Center, Annapolis, MD
Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC
Women’s Malignancy Group, MD Anderson Cancer Center, Houston, TX
3rd Milan Breast Conference, Milan, Italy
Gordon Conference on Polyamines, New London, CT
Australian Society for Breast Diseases, Surfers Paradise, Australia (by video conference)
White House/Komen Breast Cancer Summit, Washington, DC
3rd Annual Lynn Sage Breast Cancer Symposium, Northwestern University, Chicago, IL
Hematology-Oncology Board Review, George Washington University School of Medicine, Arlington, VA
Berlex Oncology Foundation Clinical Pharmacology of Anticancer Drugs, Leesburg, VA
Tumor Board, Greater Baltimore Medical Center, Baltimore, MD
Hematology Grand Rounds, Johns Hopkins, Baltimore, MD
William L. McGuire Memorial Lecture, 24th Annual San Antonio Breast Cancer Symposium, San Antonio, TX

2002
Breast Cancer Symposium Think Tank 12, St. Maarten, The Netherlands Antilles
Grand Rounds Department of Medicine, Johns Hopkins University, Baltimore, MD
Current Trends in Breast Cancer, Philadelphia, PA
3rd European Breast Cancer Conference, Barcelona, Spain
The Third North American Symposium on Skeletal Complications of Malignancy, National Institutes of Health, Bethesda, MD
Educational Symposium, American Society for Clinical Oncology, Orlando, FL
4th Milan Breast Cancer Conference, Milan, Italy
Second International Conference on Recent Advances and Future Directions in Endocrine Manipulation of Breast Cancer, Cambridge, MA
Breast Cancer: Current Controversies and New Horizons, Dana Farber Cancer Institute, Boston, MA
Center for Cancer Research Grand Rounds, National Cancer Institute, Bethesda, MD
2nd Annual Karmanos Cancer Institute Breast Cancer Symposium, Detroit, MI
Era of Hope, Department of Defense Breast Cancer Research Program, Orlando, FL
Fox Chase Cancer Center, Philadelphia, PA
IX Congresso Nacional de Oncologia, Lisbon, Portugal

2003
NCI – Hopkins Workshop on Clinical Translation of Gene Re-expression in Cancer, Baltimore, MD
Breast Cancer Think Tank 13, Aruba
20th Annual Miami Breast Cancer Conference, Miami, FL
8th International Conference on Primary Therapy of Early Breast Cancer, St. Gallen, Switzerland
American Society for Breast Disease, Dallas, TX
Upper Chesapeake Medical Center, Fallston, MD
American Society of Clinical Oncology, Chicago, IL
Gordon Conference on Cancer Chemotherapy, Oxford, UK
National Cancer Institute Workshop on Ductal Lavage, Bethesda, MD
9th Annual Perspectives in Breast Cancer, Boston, MA
Cancer Education Consortium Clinical Pharmacology of Anticancer Agents, Leesburg, VA
Indiana University Cancer Center, Indianapolis, IN
4th Annual Hampton Roads Fall Cancer Conference, Portsmouth, VA
Friends of Cancer Research, Woodrow Wilson International Center for Scholars, Washington, DC
Astrazeneca Breast Cancer Symposium, Waltham, MA

2004
Breast Cancer Think Tank 14, St Kitts
Translational Conference, Johns Hopkins Oncology Center, Baltimore, MD
Breast Cancer—Bench to Bedside, Loyola University, Chicago, IL
Massachusetts General Hospital, Boston, MA
4th European Breast Cancer Conference, Hamburg, Germany
American Association for Cancer Research, Orlando, FL
The Philip A. Tumulty Topics in Clinical Medicine at Johns Hopkins, Baltimore, MD
Medical Grand Rounds, University of Florida—Shands Medical School, Gainesville, FL
Henry Lemon Memorial Lecture, University of Nebraska—Eppley Cancer Center, Omaha, NE
Discussant, Best of Oncology Symposium, American Society of Clinical Oncology, New Orleans, LA
6th Milan Breast Cancer Symposium, Milan, Italy
Gordon Conference on Molecular Therapeutics of Cancer, New London, NH
7th Annual Mission Conference of the Susan G. Komen Breast Cancer Foundation, Washington, DC
George Washington University Hematology-Oncology Board Review Course, Alexandria, VA
Cancer Education Consortium Clinical Pharmacology of Anticancer Agents, Leesburg, VA
6th Lynn Sage Breast Cancer Symposium of Northwestern University, Chicago, IL
Alta Bates Summit Medical Center, Berkeley, CA
Association of Northern California Oncologists, San Francisco, CA
4th American Association for Cancer Research Prevention Meeting, Seattle, WA
Project LEAD, National Breast Cancer Coalition, Washington, DC
Mayo Clinic Oncology Society, Rochester, MN
Department of Molecular Pharmacology and Experimental Therapeutics, Mayo Clinic, Rochester, MN
Career Day, Baltimore Polytechnic Institute, Baltimore, MD
2nd Breast Cancer Inter-SPORE Meeting, Chapel Hill, NC
27th Annual San Antonio Breast Cancer Symposium, San Antonio, TX

2005  Greenebaum Cancer Center, University of Maryland Medical School, Baltimore, MD
Breast Cancer Think Tank 15, Curacao
22nd Miami Breast Cancer Symposium, Miami, FL
Lorne Cancer Conference, Phillip Island, Australia
Delaware Oncology Society, Wilmington, DE
New Strategies in Breast Cancer Conference, Philadelphia, PA
Educational Symposium, American Society of Clinical Oncology, Orlando, FL
Highlights of the Day Symposium, American Society of Clinical Oncology, Orlando, FL
National Breast Cancer Coalition Fund Annual Advocacy Conference, Washington, DC
Third International Symposium on the Molecular Biology of Breast Cancer, Molde, Norway
Breast Cancer: Current Controversies and New Horizons, Harvard Medical School, Boston, MA
New England Journal of Medicine Clinical Pathologic Conference, Harvard Medical School, Boston, MA
Hematology-Oncology Board Review, George Washington University Medical Center, Washington, DC
Frances Bull Lecture, University of Michigan, Ann Arbor, MI
University of Minnesota Cancer Center, Minneapolis, MN
50th Anniversary Avon Foundation Symposium, New York City, NY
Cancer Education Consortium Clinical Pharmacology of Anticancer Agents, Leesburg, VA
100 Women Professors Symposium, Johns Hopkins, Baltimore, MD
Working Group on Translational Epigenetics in Cancer, National Cancer Institute, Bethesda, MD

2006  Mayo Clinic, Rochester, MD
Helen Padykula Lecture, Wellesley College, Wellesley, MA
Lynne Abraham Symposium, Susan G. Komen Foundation, New York City, NY
Third Current Concepts in the Multidisciplinary Management of Breast Cancer, Johns Hopkins, Baltimore, DC
Vth Santiago Breast Cancer Symposium, Santiago, Chile
8th Milan Breast Cancer Symposium, Milan, Italy
International Union Against Cancer (UICC) World Cancer Congress, Washington, DC
8th Lynn Sage Breast Cancer Symposium, Chicago, IL
Hematology-Oncology Board Review, George Washington University Medical Center, Washington, DC
Cancer Education Consortium Clinical Pharmacology of Anti-Cancer Agents, Leesburg, VA
44th Meeting of the Japan Society of Clinical Oncology, Tokyo, Japan
National Comprehensive Cancer Network Adjuvant Therapy in Breast Cancer Symposium, Baltimore, MD
Women’s Board, Johns Hopkins Hospital, Baltimore, MD
National Cancer Institute-Ft. Detrick Distinguished Scientist Seminar, Frederick, MD
Science Lecture Series 2006-7 Radcliffe Institute for Advanced Study, Cambridge, MA

2007
Johns Hopkins Workshop on Clinical Targeting of Epigenetic Changes in Cancer Treatment, Phoenix, Arizona
24th Annual Miami Breast Cancer Conference, Miami, FL
6th Annual Mid-Atlantic Oncology Update, St Agnes Hospital, Baltimore, MD
10th International Conference on Primary Therapy of Early Breast Cancer, St. Gallen, Switzerland
Breast Cancer Think Tank 17, Playa del Carmen, Mexico
Annual Advances in Basic Science Symposium, Northwestern University Cancer Center, Chicago, IL
American Society of Clinical Oncology Education Symposium, Chicago, IL
10th Komen Mission Conference, Washington, DC
St Joseph’s Hospital, Baltimore, MD
Australia-New Zealand Breast Cancer Clinical Trials Annual Meeting, Alice Springs, Australia
National Cancer Advisory Board, Bethesda, MD
Hematology-Oncology Board Review, George Washington University Medical Center, Washington, DC
CR-UK Cambridge Research Institute Plenary Lecture, 3rd National Cancer Research Institute Cancer Conference, Birmingham, UK
President’s Cancer Panel, San Diego, CA
Scientific Symposium, Breast Cancer Research Foundation, New York City, NY
Florida Oncology Society, Orlando, FL
Collaborative Summit on Breast Cancer Research, Foundation for the NIH, Lansdowne, VA
American Association of Cancer Research Prevention Symposium, Philadelphia, PA

2008
7th Rosalind E. Franklin Award for Women in Science, National Cancer Institute, Bethesda, MD
Breast Cancer Think Tank 18, Waikaloa, HI
Cancer Institute of New Jersey, New Brunswick, NJ
5th Early Detection Research Network Scientific Workshop, National Cancer Institute, Bethesda, MD
Vanderbilt-Ingram Comprehensive Cancer Center, Nashville, TN
11th American Association for Cancer Research-Women in Cancer Research Charlotte Friend Award, San Diego, CA
14th Annual Educational Symposium, Susan G. Komen for the Cure Maryland, Baltimore, MD
4th Current Concepts in the Multidisciplinary Management of Breast Cancer, Johns Hopkins University, Baltimore, MD
Department of Medicine, University of Pennsylvania School of Medicine, Philadelphia, PA
Best of ASCO, Boston, MA
Annual Meeting of the American Association for Clinical Chemistry, Washington, DC
Seventh International Congress on the Future of Breast Cancer, Kauai, HI
Nuclear Hormone Receptors, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
Hematology-Onology Board Review, George Washington University, Washington, DC
Fourth Annual Oncology Congress, San Francisco, CA
Oberstar Lecture, George Washington University, Washington, DC

2009
Breast Cancer Think Tank 19, Costa Rica
Bernard Fisher Lecture, University of Pittsburgh, Pittsburgh PA
11th International Congress Oncology Conference on Primary Therapy of Early Breast Cancer, Saint Gallen, Switzerland
Grand Rounds, MD Anderson Cancer Center – Houston TX
Women Leading the Way, MD Anderson Cancer Center, Houston, TX
Jean Sindab Lecture, Emory Winship Cancer Institute, Atlanta, GA
Oncology Grand Rounds, Ohio State University, Columbus, OH
16th Annual Pennsylvanina Bar Association Women in the Profession, Pittsburgh, PA
American Society of Clinical Oncology Educational Symposium, Orlando, Fl
24th Annual Aspen Cancer Conference, Aspen, CO
Harvard Breast Cancer Conference, Boston, MA
Medical Grand Rounds, UPMC Shadyside Hospital, Pittsburgh, PA
University of Pittsburgh Postdoctoral Association Data and Dine Lecture, Pittsburgh, PA
Women's Studies and the Provost's Advisory Committee on Women's Concerns New Faculty Lecture, University of Pittsburgh, Pittsburgh, PA
Pancreasfest 2009, University of Pittsburgh, Pittsburgh, PA
AACR Advances in Breast Cancer Research, San Diego, CA
Cincinnati Cancer Symposium, Jensen Symposium on Nuclear Receptors, Cincinnati, Ohio
Translating Scientific Advances into Clinical Care Cancer, Lineberger Comprehensive Cancer Center, Chapel Hill, NC
New Options in Breast Cancer Treatment, UPMC Cancer Centers, Johnstown, PA
2010
University of Pittsburgh Winter Academy, Naples, FL
Achievement Rewards for College Scientists, Pittsburgh, PA
Medical Grand Rounds, UPMC Montefiore University Hospital, Pittsburgh, PA
Katz Lecture, Magee Womens Hospital of Pittsburgh, Pittsburgh, PA
NYU Cancer Institute Seminar Series, New York, NY
The Regional Cancer Center, Erie, PA
Lesses Visiting Professor, Medical Grand Rounds, Beth Israel Deaconess Medical Center, Boston, MA
Hematology-Oncology Grand Rounds, Beth Israel Deaconess Medical Center, Boston, MA
University of Maryland Marlene and Stewart Greenebaum Cancer Center, Hormone Responsive Cancer Program Retreat, Baltimore, MD
Lois O’Grady Breast Cancer Lecture, University of California Davis Cancer Center, Sacramento, CA
11th Annual Advances in Oncology, University of California Davis Cancer Center, Sacramento, CA
American Society of Clinical Oncology Breast Cancer Symposium - Gianni Bonadonna Award, Washington, DC
Advances in Oncology, Keynote speaker, UPMC Beacon Hospital, Ireland
Oncology Grand Rounds, Thomas Jefferson University Kimmel Cancer Center, Philadelphia, PA

2011
Dept of Environmental & Occupational Health, University of Pittsburgh, Pittsburgh, PA
Department of Pharmaceutical Sciences, University of Pittsburgh, Pittsburgh, PA
Breast Cancer Program Retreat, UCSF Cancer Center, San Francisco, CA
Lineberger Cancer Center, UNC Chapel Hill, Chapel Hill, NC
XI Michelangelo Foundation Seminar, Milan Italy
Georgetown University, Undergraduate Research Conference Keynote Speaker, Washington, DC
City of Hope Cancer Center Grand Rounds, Duarte, CA
Cleveland Clinic Grand Rounds, Taussig Cancer Center, Cleveland, Ohio
McArdle Laboratory Seminar, University of Wisconsin, Madison, WI
13th Milan Breast Cancer Conference, Milan, Italy
Annual Meeting, American Society of Clinical Oncology, Chicago, IL
International Cancer Conference, Trinity Medical School, Dublin, Ireland
Fifth Annual Ri.MED Scientific Symposium, Palermo, Italy
Medical Oncology Board Review, George Washington University, Washington, DC
Department of Epidemiology, University of Pittsburgh, Pittsburgh, PA
Department of Pharmacology and Chemical Biology, University of Pittsburgh, Pgh, PA
San Antonio Breast Cancer Symposium, San Antonio, TX
2012  Breast Cancer Think Tank 22, Mexico
Siteman Cancer Center at Washington University, Saint Louis, MO
Miami Breast Cancer Conference, Miami, FL
University of Pittsburgh Department of Pathology, Pittsburgh, PA
American Society of Preventive Oncology, Washington, DC
Tsinghua University, Beijing, China
University of Pittsburgh, Chancellors Inaugural Lecture - Hillman Professor of Oncology, Pittsburgh, PA
University of Chicago Cancer Biology Seminar Series, Chicago, IL
Johns Hopkins University School of Medicine, Baltimore, MD
American Society of Clinical Oncology, Chicago, IL
34th Annual Scientific Meeting, Australia-New Zealand Breast Cancer Trials Group, Hobart, Australia
Medical Oncology Board Review, George Washington University, Washington, DC
University of Texas Southwestern, Pamela Hearn Isom Lecture, Medicine Grand Rounds, Dallas Texas
Potamkin Lecture, PA Breast Cancer Coalition Conference, Harrisburg, PA
Northwestern University Feinberg School of Medicine’s 16th Annual Department of Pathology Joseph C. Calandra Lecture, Chicago, IL
The Shanghai Breast Cancer Symposium, Shanghai, China

2013  Bay City Capital Scientific Advisory Board Meeting
13th International Congress Oncology Conference on Primary Therapy of Early Breast Cancer, St. Gallen, Switzerland
Annual Meeting, American Association of Cancer Research, Washington, DC
Case Western Reserve Comprehensive Cancer Center, Cleveland, Ohio
Medical Oncology Board Review, George Washington University, Washington, DC
The Hong Kong University of Science and Technology, Tetralateral Symposium, Hong Kong
PA Cancer Planning Summit, Pittsburgh, PA
Breast Cancer Symposium, San Francisco, CA
Cancer Caucus, House of Representatives, Harrisburg, PA
Science 2013, Pittsburgh, PA
Global Breast Cancer Conference, Seoul, South Korea

2014  Annual Meeting, American Association for Cancer Research, San Diego, CA
American Society of Clinical Oncology, Chicago, IL
German Cancer Research Center (DKFZ), Heidelberg, Germany
Medical Oncology Board Review, George Washington University, Washington, DC
National Cancer Advisory Board, Bethesda, MD
International Oncology Symposium, Astana, Kazakhstan
University of Chicago Simon M. Shubitz Lecture, Chicago, IL
Congressional Briefing, Alliance for Health Reform, Washington, DC
PATENTS GRANTED:


EDITORIAL BOARDS:

1995-2005 Cancer Research
1995-2009 The Breast Journal
1996-2011 The Breast
1997-2005 American Journal of Medicine
1999-2005 Clinical Cancer Research
2007-2014 Hem/Onc Today
2008-present Oncology
2008-present Cancer Prevention Research
2012-present Journal of the National Cancer Institute
2012-present Breast Cancer Research and Treatment

STUDY SECTION MEMBERSHIPS:
1988 Member, Ad Hoc Technical Review Section, National Cancer Institute, Bethesda, MD
1990, 1991, 1992 Ad Hoc Member, Reproductive Endocrinology Study Section, National Institutes of Health, Bethesda, MD
1992-1993 Member, Awards Committee, Susan G. Komen Foundation, Dallas, TX
1993-1997 Member, Reproductive Endocrinology Study Section, National Institutes of Health, Bethesda, MD
1994 Member, Walt Disney – American Cancer Society Breast Cancer Professorship Selection Committee, Atlanta, GA
1997-1998 Co-Chair, Progress Review Group for Breast Cancer Research, National Cancer Institute, Bethesda, MD
1996-1998 Chair, Pre-clinical and Clinical Studies Study Section, California Breast Cancer Research Program, San Francisco, CA
1999-present Medical Advisory Board, Breast Cancer Research Foundation, New York City, NY
2001 Member, Breast and Prostate SPORE Review Group, National Cancer Institute
2002 Co-chair, Breast Cancer SPORE Review Group, National Cancer Institute
2003-2008 Vice-Chair, National Cancer Institute Breast Cancer Intergroup Correlative Science Committee
2002-2005 Member, Charles Kettering Prize Selection Committee, General Motors Cancer Research Foundation, Chair, 2005
2003 Chair, Innovator Award Review Committee, Department of Defense Breast Cancer Program
2005 Member, Lung and Bladder Cancer SPORE Review Group, National Cancer Institute
2005-2006 Ad hoc member, Kimmel Scholars Award Committee
2006-present Member, Kimmel Scholars Award Committee
2006-2010 Member, Subcommittee A – Cancer Centers, National Cancer Institute
2008 Co-chair, Lung Cancer and Lymphoma SPORE Review Group, National Cancer Institute
2008-present Member, Scientific Advisory Board, V Foundation for Cancer Research
2008 Chair, Therapeutic Targets I Review Committee, Susan G Komen for the Cure
2012-present Member, Damon Runyon Cancer Research Foundation Clinical Investigator Award Committee
2012-2013 Chair of the Cancer Program Review, Helmholtz Senate Commission, Helmholtz Association of German Research Centers, Berlin, Germany
2014 Member, Scientific Advisory Committee, Breakthrough Breast Cancer, London, UK
2014- Chair, CTAC SPORE Program Evaluation Working Group, NCI
2015 Chair, Stand Up To Cancer Canada-Canadian Breast Cancer Foundation Breast Cancer Dream Review Team Committee

EXTRA-MURAL GRANT REVIEWING
Ad hoc grant reviewer for: National Institutes of Health, American Cancer Society, Veterans Administration, Manitoba (Canada) Health Council, Health Research Council of New Zealand, National Cancer Institute - Canada, Medical Research Council - Canada, Department of Defense Breast Cancer Program, many others

**ADVISORY BOARD MEMBERSHIPS:**

2000-present  Member, External Advisory Board, Vanderbilt-Ingram Cancer Center, Nashville, TN
2001-2006  Member, External Advisory Board, Fox Chase Cancer Center, Philadelphia, PA
2001-2011  Member, External Advisory Board, Bay Area UCSF Breast Cancer SPORE, San Francisco, SF
2003-present  Member, External Advisory Board, Karmanos Cancer Center, Detroit, MI
2003-2008  Member, External Advisory Board, Indiana University Cancer Center, Indianapolis, IN
2005-present  Member, External Advisory Board, University of Maryland Cancer Center, Baltimore, MD
2008-present  Member, Board of Scientific Consultants, Memorial Sloan Kettering Cancer Center, New York City, NY
2008-present  Member, External Advisory Board, Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, Chapel Hill, NC, Chair 2014-
2009-present  Member, External Advisory Board, MD Anderson Cancer Center, Houston, TX Chair 2014-
2010-present  Member, External Advisory Board, University of Michigan Comprehensive Cancer Center
2010-present  Member, External Advisory Board, Washington University Siteman Cancer Center, St. Louis, MO
2010-present  Member, External Advisory Board Breast Cancer SPORE, Mayo Clinic, Rochester, MN
2010-present  Member, External Advisory Board, Institut National du Cancer, Paris, France
2012-present  Member, Scientific Advisory Board, CTSA, Case Western Reserve University School of Medicine, Cleveland, Ohio
2012-present  Member, Scientific Advisory Board, Cologne Center for Integrated Oncology, Cologne, Germany
2012-present  Member, External Advisory Board, Fred Hutchinson Cancer Research Center University of Washington Cancer Consortium, Seattle, Washington
2013-present  Member, External Advisory Board, Baylor College of Medicine Breast Cancer SPORE
2014-present  Member, External Advisory Board, University of Chicago Comprehensive Cancer Center, Chicago, IL
2014-2015  Member, Scientific Advisory Board, A. Alfred Taubman Medical Research Institute, University of Michigan, Ann Arbor, MI
LIST OF CURRENT RESEARCH INTERESTS:
Cancer biology and treatment, especially breast cancer

SERVICE

1. UNIVERSITY AND MEDICAL SCHOOL:
Committees - Johns Hopkins
1987 Co-Director, Oncology Multidisciplinary Conference
1987-1997 Member, Oncology Fellowship Selection Committee
1993-1995 Department Representative, Medical School Council
1999-2003 Departmental Appointments and Promotions Committee
2000-2005 Member, School of Medicine Professorial Promotion Committee
2001-2009 Member, MD-PhD Admissions Committee
2003-2005 Member, Search Committee for Director of Biophysics and Biophysical Chemistry

Committees – University of Pittsburgh, University of Pittsburgh Physicians (UPP), UPMC
2009-present Member, Chair Management Committee
2009-present Member, UPP Clinical Chairs Committee
2009-present Member, Breast Cancer Steering Committee
2009-present Member, Clinical Research Oversight Committee
2009-2012 Member, ReSet Steering Committee
2009-present Member, Adolescent and Young Adult Cancer Committee
2010-2011 Member, Search Committee for Department of Medicine Chairman
2011-2012 Member, Search Committee for the Institute of Personalized Medicine
2012-present Member, UPMC Presbyterian Shadyside Hillman Cancer Committee
2012-present Member, School of Medicine Financial Oversight Committee
2014-present Member, Internal Advisory Board Gynecologic SPORE
2015-present Member, Internal Advisory Board for the Center for Causal Discovery
2015-present Member, Internal Advisory Board of the Center for Medical Counter Measures Against Radiation (CMCR)

2. EXTERNAL ORGANIZATIONS:
1993-1995 Member, Medical Advisory Committee, Maryland Cancer Consortium
1994-1996 Executive Committee, American Cancer Society – Maryland Division
Chair, Research Committee
1995-1998 Member, Medical Knowledge Self Assessment Program 11-Oncology, American
College of Physicians
1999-2000 Planning Committee, National Institutes of Health Consensus Development
Conference on Adjuvant Therapy for Breast Cancer, Bethesda, MD
1998-2001 Data Monitoring Committee, Southwest Oncology Group
1999-2006 Data Monitoring Committee, RUTH Trial, Lilly
2000-2006  Data Monitoring Committee, Breast Cancer International Research Group (BCIRG)
2006-2011  Member, Data and Safety Monitoring Committee, TEACH Trial, Glaxo Smith Kline
2009-2012  NMR Center Advisory Committee, Carnegie Mellon University
2010-present  Co-Chair, Breast Cancer Steering Committee, National Cancer Institute
2011-present  Member, Clinical Trials and Translational Research Advisory Committee (CTAC), National Cancer Institute, Chair 2015-present
2013-present  Board of Trustees, Phipps Conservatory, Pittsburgh, PA
2015-  Member, Search Committee for the Scientific Director (SD), Center for Cancer Research (CCR), National Cancer Institute
2015-  Member, Breast Cancer Now’s Science Strategy Committee