

## BIOGRAPHICAL SKETCH

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| NAME<br>Kristine Glunde   | POSITION TITLE<br>Associate Professor of Radiology |       |                         |
|---|--|-------|-------------------------|
| eRA COMMONS USER NAME (credential, e.g., agency login)<br>kglunde1  |  |       |                         |
| EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.) |  |       |                         |
| INSTITUTION AND LOCATION  | DEGREE<br>(if applicable)                          | MM/YY | FIELD OF STUDY          |
| University of Bremen, Bremen, Germany   | Diploma  | 1997  | Chemistry, Biochemistry |
| University of Bremen, Bremen, Germany   | Ph.D.  | 2000  | Biochemistry            |
| The Johns Hopkins University School of Medicine, Baltimore, Maryland, U.S.A.  | Post-doctoral                                      | 2003  | Cancer Biology/Imaging  |

### A. Personal Statement

My research interests are in molecular imaging of cancer, with specific training and expertise in key research areas for this application, such as optical fluorescence and second harmonic generation microscopic imaging, magnetic resonance spectroscopic imaging, and mass spectrometric imaging. Since joining the Faculty of the Molecular Imaging Program in the Radiology Department of the Johns Hopkins University School of Medicine in 2003, I have been involved in several studies on multi-modal molecular imaging of cancer as Principal Investigator or Co-Investigator. The PET-MR scanner will significantly expand the scope of my research studies.

### B. Positions and Honors

#### Positions and Employment

|               |   |
|---------------|---|
| 10/1997-07/00 | Doctoral Research Assistant, Department of Chemistry & Biology, University of Bremen, Bremen, Germany.  |
| 09/2000-09/03 | Postdoctoral Fellow, Department of Radiology and Radiological Sciences, Division of MR Research – Oncology Section, Johns Hopkins University School of Medicine, Baltimore, MD. |
| 09/2003-03/05 | Instructor, Department of Radiology and Radiological Sciences, Division of MR Research – Oncology Section, Johns Hopkins University School of Medicine, Baltimore, MD.          |
| 03/2005-10/09 | Assistant Professor, Department of Radiology and Radiological Sciences, Division of MR Research – Oncology Section, Johns Hopkins University School of Medicine, Baltimore, MD. |
| 10/2009       | Associate Professor, Department of Radiology and Radiological Sciences, Division of MR Research – Oncology Section, Johns Hopkins University School of Medicine, Baltimore, MD. |

#### Other Experience and Professional Memberships

|      |   |
|------|---|
| 1999 | International Society for Magnetic Resonance in Medicine (ISMRM). |
| 2002 | American Association for Cancer Research (AACR).                  |
| 2003 | American Society for Cell Biology (ASCB).                         |
| 2004 | Society for Molecular Imaging.                                    |

#### Journal Reviewing Activities

*ACS Chemical Reviews, Bioconjugate Chemistry, Cancer Research, Clinical Cancer Research, Journal of the American Chemical Society (JACS), Journal of Medicinal Chemistry, Journal of Neuroscience Research, Molecular Imaging, Nature Reviews Cancer, NMR in Biomedicine, The Lancet Oncology.*

#### Grant Reviewing Activities

Department of Defense (DoD), European Science Foundation (ESF), The Israel Science Foundation (ISF), National Institutes of Health (NIH), National Sciences and Engineering Research Council of Canada (NSERC).

## **Honors**

|         |  |
|---------|--|
| 1997    | Excellence Award “Stiftung Constancia von 1823” – awarded for the Diploma Thesis at the University of Bremen.                            |
| 1997-00 | FNK Ph. D. Student Stipend – FNK (Research Foundation Associated with the University of Bremen), University of Bremen.                   |
| 1999-02 | Three Student Stipend Awards – International Society for Magnetic Resonance in Medicine (ISMRM).   |
| 2000    | Travel Award – Deutsche Forschungsgemeinschaft (German Research Foundation).   |
| 2003    | Career Development Award – <i>in vivo</i> Cellular and Molecular Imaging Center (ICMIC, NIH-funded) at the Johns Hopkins University.     |
| 2005    | Travel Award – International Conferences on Magnetic Resonance in Biological Systems (ICMRBS)  |
| 2005    | 1st Place Poster Award MR Spectroscopy – ISMRM in Miami, Florida, USA  |
| 2007    | Nomination and Participation in the 57th Meeting of Nobel Laureates in Physiology or Medicine in Lindau, Germany – Siemens Travel Award. |

## **C. Selected Peer-reviewed Publications (Selected from 42 peer-reviewed publications)**

### **Most relevant to the current application**

1. Li, C., Greenwood, T. R., Bhujwalla, Z. M., and Glunde, K. Synthesis and characterization of glucosamine-bound near-infrared probes for optical imaging. *Org. Lett.* 2006; 8, 3623-3626.
2. Li, C., Greenwood, T. R., and Glunde, K. Glucosamine-bound near-infrared fluorescent probes with lysosomal specificity for breast tumor imaging. *Neoplasia* 2008; 10, 389-98. PMID:PMC2288541.
3. Kakkad, S., Solaiyappan, M., O'Rourke, B., Stasinopoulos, I., Ackerstaff, E., Raman, V., Bhujwalla, Z. M., and Glunde, K. Hypoxic tumor microenvironments reduce collagen I fiber density. *Neoplasia* 2010; 12, 608-617. PMID:PMC2915405.
4. Amstalden van Hove, E. R., Blackwell, T. R., Klinkert, I., Eijkel, G., Heeren, R. M. A., Glunde, K. (2010) Imaging single elements and the lipidome of breast tumor xenografts: a multi-modal imaging approach. *Cancer Res.* 70, 9012-21. PMC Journal – In Process.
5. Chen, Y., Yuan, S., Li, Q., Naphas, R., Wierwille, J., Blackwell, T. R., Winnard, P. T. Jr., Raman, V., and Glunde, K. (2010) Integrated Optical Coherence Tomography (OCT) and Fluorescence Lamellar Optical Tomography (FLOT). *IEEE Journal of Selected Topics in Quantum Electronics*, In Press.

### **Additional recent publications of importance to the field (in chronological order)**

6. Glunde, K., Jie, C., and Bhujwalla, Z. M. Mechanisms of indomethacin-induced alterations in choline phospholipid metabolism of breast cancer cells. *Neoplasia* 2006; 8, 758-771.
7. Glunde, K., Jacobs, M. A., Bhujwalla, Z. M. Choline Metabolism in Cancer: Implications for Diagnosis and Therapy. *Expert Rev. Mol. Diagn.* 2006; 6, 821-829.
8. Glunde, K. and Serkova, N. J. Profiling of Choline Metabolites in Cancer. *Pharmacogenomics* 2006; 7, 1109-1123.
9. Stasinopoulos, I., O'Brien, D. R., Wildes, F., Glunde, K., and Bhujwalla, Z. M. Silencing of cyclooxygenase-2 inhibits metastasis and delays tumor onset of poorly differentiated metastatic breast cancer cells. *Mol. Cancer Res.* 2007; 5, 435-442.
10. Mori, N., Glunde, K., Takagi, T., Raman, V., and Bhujwalla, Z. M. Choline kinase down-regulation increases the effect of 5-fluorouracil in breast cancer cells. *Cancer Res.* 2007; 67, 11284-11290.
11. Nimmagadda, S., Glunde, K., Pomper, M. G., and Bhujwalla, Z. M. Pharmacodynamic markers for choline kinase downregulation in breast cancer cells. *Neoplasia* 2008; 11, 477-484. PMID:PMC2671858.
12. Serkova, N. J. and Glunde, K. Metabolomics of Cancer. *Methods Mol. Biol.* 2009; 520, 273-95.
13. Iorio, E., Ricci, A., Bagnoli, M., Pisanu, M. E., Castellano, G., Di Vito, M., Venturini, E., Glunde, K., Bhujwalla, Z. M., Mezzanzanica, D., Canevari, S., and Podo, F. Activation of phosphatidylcholine cycle enzymes in human epithelial ovarian cancer cells. *Cancer Res.* 2010, 70, 2126-35. PMID:PMC2831129.
14. Glunde, K., Artemov, D., Penet, M.-F., Jacobs, M. A., and Bhujwalla, Z. M. (2010) Magnetic Resonance Spectroscopy in Metabolic and Molecular Imaging and Diagnosis of Cancer. *Chem Rev.* 110, 3043-59. PMID:PMC2877696.

## **D. Research Support**

### **Ongoing Research Support**

2P50CA103175-06A2 (Bhujwalla)

09/22/11 - 07/31/16

NCI JHU ICMIC Program

This center grant funds an *in vivo* Cellular and Molecular Imaging Center at Johns Hopkins. The program consists of four research components, four developmental projects, one career development award and four resources.

R01 CA134695 (Glunde/Heeren)

08/01/08-07/31/13

NIH/NCI/NIBIB

Imaging hypoxia-driven signaling pathways in the breast tumor microenvironment

The aim of this application is to discover, identify, and validate biomolecules that are differentially expressed under hypoxia in breast tumor models using mass spectrometry imaging.

NCI/NIH R01CA154725 (Glunde)

07/01/11-06/30/16

Multi-scale Molecular Imaging of the Degradome in Breast Tumors

In this R01 application we will focus on optical imaging of the degradome, including lysosomes, cathepsins, and matrix metalloproteases, in conjunction with imaging the extracellular matrix in animal models of primary breast tumors and metastases to assess the concerted functional roles of the degradome in the metastatic process.

NIH-NCI R01CA138264 (Popel)

02/13/09-12/31/13

Predictive Experiment-Based Multiscale Models of Angiogenesis in Breast Cancer

The major goal of this project is to develop predictive multiscale models of breast cancer. Mouse model xenografts of human breast cancer will be used; multiscale imaging studies and molecular studies will provide the foundation for models validation.

NIH R01CA136576 (Bhujwalla)

07/01/09-06/30/14

Imaging Hypoxia and Cancer Stem Cells

The goal of this project is to understand the role of the tumor microenvironment and choline metabolism in harboring or creating stem-like cancer cells.

NCI 2R01CA82337-11 (Bhujwalla)

04/01/11-03/31/16

Hostile Environments Promote Invasion and Metastasis

COX-2 is a critically important target in cancer that significantly influences a range of characteristics such as angiogenesis, invasion and metastasis. In this application we intend to uncover new targets that interact with COX-2, and identify the effect of COX-2 expression on extracellular matrix structure and function. We also intend to develop probes to noninvasively image COX-2 expression and activity that will allow us to further understand the role of this enzyme in cancer and allow us to effectively target it and investigate the sequence of establishment of hypoxic foci in lymphatic metastatic sites and ascites.

### **Completed Projects Within Last Three Years**

NCI P30CA06973 (Nelson)

05/01/06-04/30/12

Cancer Center Support Grant - Functional Imaging Core

To provide an imaging resource for the Sidney Kimmel Comprehensive Cancer Center.

NCI P50CA103175-05S1 (Bhujwalla)

08/01/03-07/31/11 NCE

JHU ICMIC Program

This center grant funds an *in vivo* Cellular and Molecular Imaging Center at Johns Hopkins. The program consists of four research components, developmental projects, career development awards and five resources.

1 R21 CA112216 (Glunde)

06/01/05-05/31/08

NIH/NCI

Imaging lysosomes to predict metastasis in breast cancer

The aim of this R21 is to develop novel imaging techniques to optically image lysosomes, and to assess the role of lysosomal trafficking in breast cancer invasion and metastasis.