
AGATA A. EXNER, PH.D.

**CURRENT
APPOINTMENT**

Assistant Professor
Department of Radiology
Case Western Reserve University & University Hospitals of Cleveland
11100 Euclid Avenue, Bishop s606
Cleveland, Ohio 44106-5056
E-mail: agata.exner@cwru.edu

**ACADEMIC
APPOINTMENTS**

2004- Assistant Professor (secondary), Dept. of Biomedical Engineering, Case Western Reserve University, Cleveland, OH
2004- Member, Case Comprehensive Cancer Center, Case Western Reserve University
7/2003- Assistant Professor (primary), Dept. of Radiology, Case Western Reserve University
2/2003-7/2003 Visiting Professor, Dept. of Radiology, Case Western Reserve University
1998-2003 Graduate Research Associate, Dept. of Biomedical Engineering, Case Western Reserve University
1997-1998 Research assistant, Department of Biomedical Engineering, The Cleveland Clinic Foundation, Cleveland, OH
1996 Research assistant, Department of Macromolecular Science, Case Western Reserve University, Cleveland, OH

EDUCATION

2000-2003 **Ph.D.**, Biomedical Engineering
Case Western Reserve University, Cleveland, OH
Thesis title: Noninvasive CT Monitoring and Evaluation of Local Drug Delivery in Livers Following Radiofrequency Ablation (RFA).
1998-2000 **M.S.**, Biomedical Engineering
Case Western Reserve University, Cleveland, OH
Concentration: drug delivery / biomaterials / imaging
1994-1998 **B.S. (Magna Cum Laude)**, Biomedical Engineering
Case Western Reserve University, Cleveland, OH
Concentration: Biomaterials; Minor: chemistry

HONORS

2007 Cum Laude Award for outstanding scientific paper, Society of Computed Body Tomography and Magnetic Resonance
2006 Nominee for the Carl Wittke Award for Excellence in Undergraduate Teaching, CWRU
2005 Learning Scholar, University Center for Innovation and Teaching Excellence, CWRU
2004-2006 National Institutes of Health Clinical Research Loan Repayment Program Award recipient
2002 Society for Biomaterials Travel and Professional Development Award
2002 New Jersey Biomaterials Symposium Travel Award
2001-2003 National Institutes of Health Trainee Research Grant

1998-2001	Whitaker Foundation Trainee Research Grant
1997-1998	Case Alumni Association Scholarship
1996	Whitaker Undergraduate Research Fellowship

PEER-REVIEWED PUBLICATIONS

* indicates student in Exner Lab

**denotes publications published under my maiden name (Szymanski) and transition name (Szymanski-Exner)

1. Wu H, **Exner AA**, Weinberg B*, Krupka T*, Haaga JR. Radiofrequency ablation: Effect of tumor blood flow modulation by vasoactive drugs on coagulation size in a rat subcutaneous tumor model. *Radiology*, *Submitted*.
2. Weinberg BD*, Blanco E, **Exner AA**, Saidel G, Gao J. Modeling Doxorubicin Transport to Improve Intratumoral Drug Delivery to RF Ablated Tumors, *Journal of Controlled Release*, *In press*
3. Weinberg B*, Krupka TM*, Haaga JR, **Exner AA**. A combination of sensitizing pretreatment and radiofrequency ablation evaluated in a rat carcinoma model, *Radiology*, *In press*
4. Krupka TM*, Weinberg B*, Ziats NP, **Exner AA**. Effect of Intratumoral Injection of Carboplatin Combined with Pluronic P85 or L61 on Experimental Colorectal Carcinoma in Rats, *Experimental Biology and Medicine*. 2007; 232 (7).
5. Weinberg BD*, Blanco E, Lempka SF, Anderson JM, **Exner AA**, Gao J 2007. Combined radiofrequency ablation and doxorubicin-eluting polymer implants for liver cancer treatment. *J Biomed Mater Res A* 81(1):205-213.
6. Krupka TM*, Weinberg B*, Ziats NP, Haaga JR, **Exner AA**. Injectable polymer depot combined with radiofrequency ablation for treatment of experimental carcinoma. *Investigative Radiology*, 2006;41(12):890-897.
7. Haaga JR, **Exner A**, Fei B, Seftel A. Semiquantitative imaging measurement of baseline and vasomodulated normal prostatic blood flow using sildenafil. *Int J Impot Res*. 2007;19(1):110-3.
8. Haaga JR, **Exner AA**, Wang Y, Stowe NT, Tarcha PJ. Combined Tumor Therapy by Using Radiofrequency Ablation and 5-FU-Laden Polymer Implants: Evaluation in Rats and Rabbits. *Radiology*. 2005; 237(3):911-8.
9. **Exner AA**, Krupka TM*, Scherrer K*, Teets JM*. Enhancement of carboplatin toxicity by Pluronic block copolymers. *J Controlled Release*, 106(1-2):188-197, 2005.
10. Deng CX, Dogra V, **Exner A**, Stowe N, Wang H, Bhatt S, Zhou Y, Haaga JR. Application of high intensity focused ultrasound to stop post biopsy bleeding: feasibility study in a porcine model. *Ultrasound in Medicine and Biology*, 30(11):1531–1537, 2004.
11. **Exner AA**, Weinberg BD, Stowe NT, Gallacher A, Wilson DL, Haaga JR, Gao J. Quantitative computed tomography analysis of local chemotherapy in liver tissue after radiofrequency ablation. *Acad Radiol*. 11(12):1326-36, 2004.
12. **Szymanski-Exner A**, Gallacher A, Stowe NT, Weinberg B, Haaga JR, Gao J. Local carboplatin delivery and tissue distribution in livers after radiofrequency ablation. *J. Biomed. Mat. Res*, 67A(2): 510-516, 2003.
13. **Szymanski-Exner A****, Stowe NT, Salem KA, Lazebnik RS, Haaga JR, Wilson DL, Gao J. Noninvasive monitoring of local drug release using x-ray computed tomography: Optimization and in vivo / in vitro validation. *J. Pharm. Sci*. 92(2):289-296, 2003.

14. Qian F, Saidel GM, Sutton DM, **Exner A**, Gao J. Combined Modeling and Experimental Approach for the Development of Dual-Release Polymer Millirods. *J. Controlled Release*, 83(3):427-437, 2002.
15. **Szymanski-Exner A****, Stowe NT, Lazebnik RS, Salem KA, Wilson DL, Haaga JR, Gao J. Noninvasive monitoring of local drug release in a rabbit radiofrequency (RF) ablation model using x-ray computed tomography. *J. Controlled Release*. 83(3):415-425, 2002.
16. Gao J, Qian F, **Szymanski-Exner A****, Stowe NT, Haaga J. In vivo drug distribution dynamics in thermoablated and normal rabbit livers from biodegradable polymers. *J. Biomed. Mat. Res.* 62:308-314, 2002.
17. Salem KA, **Szymanski-Exner A****, Lazebnik R, Breen M, Gao J, Wilson D. Methods for In Vivo Evaluation of the Pharmacokinetics of Platinated Drugs Using Computed Tomography. *IEEE-TMI*,21(10):1310-1316, 2002.
18. Qian F, **Szymanski A****, Gao J. Fabrication and characterization of controlled release poly(D,L-lactide-co-glycolide) millirods. *J Biomed Mater Res.* 55(4):512-22, 2001.
19. Balgude AP, Yu X, **Szymanski A****, Bellamkonda RV. Agarose gel stiffness determines rate of DRG neurite extension in 3D cultures. *Biomaterials.* 22(10):1077-84, 2001.

PATENTS AND INVENTION DISCLOSURES

Drug delivery devices and methods; Inventors: Gao, Jinming; Qian, Feng; Exner, Agata; Haaga, John R.; Filed October 4, 2002.

Use of Diamox for improvement of lesion detection on Imaging Studies, and differentiation of benign and malignant tumor masses; Inventors: Haaga, John; Exner, Agata; Stow, Nicholas

Nontoxic sensitizing pretreatment for improved radiofrequency ablation of tumors; Inventors: Exner, Agata; Krupka, Tianyi; Weinberg, Brent; Haaga, John; Provisional patent filed Nov. 2006.

Biodegradable Markers for Radiation Treatment Planning; Inventors: Sohn, Jason, Exner, Agata, Monroe, James. Provisional patent filed Dec. 2006.

Method of detecting cancer; Inventors: Haaga, John; Haaga, Timothy; Exner, Agata; Stowe, Nicholas. Provisional patent filed July 2007.

BOOK CHAPTERS

Exner AA, Gao J, Stowe NT, "Techniques in X-Ray Computed Tomography in the Evaluation of Drug Release Systems & Their Application" in *Medical Imaging Systems: Technology and Applications*, World Scientific Publishing Co. Pte. Ltd., 2006.

INVITED LECTURES AND SEMINARS

1. "Use of Vasoactive Drugs to Facilitate RF Ablation in a Rat Model", Department of Radiology Seminar Series, Case Western Reserve University, April 11, 2007

2. "Image-guided Interventions in Oncology: Opportunities for Drug Development and Delivery", Department of Pharmaceutical Sciences, School of Pharmacy, University of Wisconsin, Madison, February 22, 2007
3. "Pills and Needles are *SO* 20th Century", Case orientation, August 24, 2006
4. "Image-guided Drug Delivery Approach to Local Cancer Chemotherapy", Case BRTT meeting, June 28, 2006
5. "Development of Functional Polymer Matrixes for Image Guided Drug Delivery", Frontiers in Biomedical Imaging Seminar Series, Department of Biomedical Engineering, Case Western Reserve University School of Medicine, March 18, 2005.
6. "Image Guided Drug Delivery: CT and Local Chemotherapy", Journal Club, Department of Radiology, Case Western Reserve University School of Medicine, March 19, 2004.
7. "Image Guided Drug Delivery: New Applications of Old Concepts", Grand Rounds (invited speaker), Department of Radiology, University Hospitals of Cleveland, March 4, 2004.

CONFERENCE PROCEEDINGS

1. Radiofrequency ablation: Effect of tumor blood flow modulation by vasoactive drugs and chemotherapy on coagulation size in a rat subcutaneous tumor model. H Wu, **AA Exner**, TM Krupka, BD Weinberg, JR Haaga. Podium presentation at 2007 Radiological Society of North America (RSNA) meeting.
2. Does CT perfusion with vasoactive agents differentiate tumor and inflammation after radiofrequency ablation? H Wu, **AA Exner**, TM Krupka, BD Weinberg, JR Haaga submitted for the 2007 Radiological Society of North America (RSNA) meeting.
3. Krupka TM, Weinberg B, Wu H, **Exner AA**, "Dual Function of Pluronic P85 in Treatment of Experimental Carcinoma in Rat". Poster presentation at the 2007 Controlled Release Society annual meeting
4. Krupka TM, Weinberg B, Haaga JR, **Exner AA**. Thermosensitizer for Hyperthermic Treatment of Tumors, Poster presentation at the Society for Biomaterials 2007 annual meeting.
5. Nour S., Exner A, Wu H, Haaga J., Use of Vasoactive Drugs to Facilitate RF Ablation in a Rat Model. Society of Computed Body Tomography and Magnetic Resonance annual meeting; March 2007; Cum Laude Award for outstanding scientific paper.
6. Krupka TM, Weinberg B, Haaga JR, **Exner AA**. Thermosensitizer for Hyperthermic Treatment of Tumors, Poster presentation at the 2007 CWRU Research ShowCase. 1st Prize Winner.
7. Weinberg BW, Patel R, **Exner AA**, Saidel G, Gao J. "Estimating Local Doxorubicin Transport Properties of Experimental Liver Carcinoma". Poster presentation at the Society for Biomaterials 2007 annual meeting.
8. Patel R, Weinberg BW, Gao J, **Exner AA**, Saidel G. "Analyzing Intratumoral Chemotherapeutic Drug Penetration in Ablated Tumors Using Finite Element Methods". Oral presentation at the Society for Biomaterials 2007 annual meeting.
9. Krupka TM, Weinberg B, Haaga JR, **Exner AA**. "Intralesional chemotherapy depot improves outcome of radiofrequency ablation in experimental carcinoma." Oral presentation at the Radiological Society of North America (RSNA) meeting, November 2006.

10. Krupka TM, Weinberg B, Haaga JR, **Exner AA**. “Intravenous thermosensitizer administration improves outcome of radiofrequency ablation in experimental carcinoma model”. Oral presentation at the Radiological Society of North America (RSNA) meeting, November 2006.
11. **Exner AA**. Research material presented in Basillion J, “Molecular Imaging in Cancer”, invited talk, Nanotech 2006 Conference of the Nano Science and Technology Institute, May 2006.
12. Weinberg B, Blanco E, Lempka S, Anderson J, **Exner A**, Gao J. “RF ablation with adjuvant doxorubicin-eluting polymer implants for treatment of experimental liver tumors”. 2006 Irwin H. Lepow Medical Student Research Day (Poster Presentation Award winner).
13. Weinberg B, Blanco E, Lempka S, Anderson J, **Exner A**, Gao J. “Radiofrequency ablation with adjuvant doxorubicin-eluting polymer implants for treatment of experimental liver tumors”. Case Research Showcase, April 2006.
14. Haaga JR, **Exner AA**, Siegel C, Post A, Nakamoto DA. „Improved CT Differential Enhancement of Tumor from Normal Liver based using a Vasodilator to Change Angiogenic Blood Flow”. American Hepato-Pancreato-Biliary Association annual meeting, March, 2006.
15. **Exner AA**, “Image-guided Radiofrequency Ablation and Local Chemotherapy”, National Institute of Biomedical Imaging and Bioengineering Annual Meeting, Washington D.C., August 8-9, 2005.
16. Krupka T, Scherrer K, Teets JM, **Exner AA**, “Pluronic P85 Improves Efficacy of Intratumoral Carboplatin Treatment”, Controlled Release Society Annual Meeting, June 2005.
17. Mehandru S, Hillenbrand C, **Exner AA**, “MRI Properties of Thermosensitive Pluronic Copolymers”, Case Research Showcase, April 2005.
18. Krupka T, Scherrer K, **Exner AA**, “Pluronic-enhanced Intratumoral Chemotherapy”, Case Research Showcase, April 2005.
19. Mehandru S, Hillenbrand C, **Exner AA**, “MRI Properties of Pluronic Triblock Copolymers”, School of Medicine Lepow Research Day, March 2005, Student Award winner.
20. Scherrer K, Krupka T, Teets M, **Exner AA**, “Enhancement of carboplatin toxicity by Pluronic® block copolymers”, Case Western Reserve University, Department of Biomedical Engineering, Undergraduate Senior Project Symposium, December 2004.
21. Smoke J, Krupka T, **Exner AA**, “Sensitization of cancer cells to hyperthermia-induced toxicity using Pluronic® block copolymers”, Case Western Reserve University, Department of Biomedical Engineering, Undergraduate Senior Project Symposium, December 2004.
22. **Exner AA**, Dhande OS, Krupka TM, Stowe NT, Haaga JR, “Quantitative CT for imaging of site-specific drug delivery”, oral presentation , Radiological Society of North America (RSNA), 2004.
23. **Exner AA**, Dhande OS, Stowe NT, Haaga JR, “Quantitative computed tomography imaging of site-specific drug delivery”, poster presentation, American Association of Pharmaceutical Scientists (AAPS), 2004.

24. Scherrer K, Krupka T, Teets M, **Exner AA**, "Enhancement of carboplatin toxicity by Pluronic® block copolymers", New Jersey Symposium on Biomaterials Science, Somerset NJ, October 2004, Undergraduate Student Award Winner.
25. Dhande OS, **Exner AA**, "Formulation and Characterization of Drug-Loaded Injectable Polymers for Local Chemotherapy", Case Western Reserve University, Department of Biomedical Engineering, Undergraduate Senior Project Symposium, May 2004.
26. Weinberg B, **Szymanski-Exner AA**, Stowe NT, Gallacher A, Wilson DL, Haaga JR, Gao J, "Noninvasive Monitoring of Local Drug Release using X-ray Computed Tomography", Controlled Release Society, June 2004.
27. **Exner AA**, "Image Guided Drug Delivery", Image-Guided Interventions, a combined NIH, NASA and NSF Workshop, Bethesda MD May 13-14, 2004.
28. **Exner AA**, Stowe NT, Bhatt S, Haaga JR. "Functional CT Imaging of Blood Flow Changes During Tumor Development", Case Western Reserve University Research Showcase, April 2, 2004.
29. Weinberg B, **Exner AA**, Stowe NT, Gallacher A, Wilson DL, Haaga JR, Gao J. "Noninvasive Monitoring of Local Carboplatin Release using X-ray Computed Tomography", Case Western Reserve University Research Showcase, April 2, 2004.
30. Haaga JR, Exner AA, Ciancibello L, Smith D, Pohlman S, Stowe NT, "Functional CT Monitoring of Tumor Blood Supply During Development and After Radiofrequency Ablation and Local 5-FU Chemotherapy in an Experimental Model", Radiological Society of North America, Chicago IL, December 2003.
31. **Szymanski-Exner A**, Gallacher A, Stowe N, Weinberg B, Haaga J, Gao J, "Local Carboplatin Delivery and Tissue Distribution in Livers Following Radiofrequency (RF) Ablation", presented at Society for Biomaterials Meeting, Reno NV, 2003.
32. Weinberg BD, **Exner AA**, Stowe NT, Lazebnik RS, Wilson DL, Gao J, "Noninvasive Monitoring of Local Carboplatin Release using X-ray Computed Tomography", Biomedical Engineering Society Annual Meeting, Nashville TN, October, 2003.
33. **Szymanski-Exner A**, Stowe NT, Gallacher A, Weinberg B, Haaga JR, Gao J, "Local carboplatin delivery to livers following radiofrequency (RF) thermal ablation", poster presentation at the 6th New Jersey Symposium on Biomaterials Science Somerset NJ, October 2002, Student Award Winner.
34. **Szymanski-Exner A**, Stowe NT, Lazebnik R, Haaga JR, Gao J, "Non-Invasive Monitoring of Drug Release from a Biodegradable PLGA Implant Using X-ray Computed Tomography: An In Vivo/In Vitro Correlation", podium presentation at the 2002 Society for Biomaterials meeting, Tampa FL, Student Award Winner.
35. Gao J, Qian F, **Szymanski-Exner A**, Stowe N, Haaga J, Comparison of Drug Distribution Profiles in Thermoablated and Normal Rabbit Livers In Vivo. Society for Biomaterials meeting, Tampa, FL, 2002.
36. Gao J, **Szymanski-Exner A**, Stowe N, Haaga J, Monitoring Carboplatin Release and Distribution in vivo by Computed Tomography, BMES meeting, 2001.
37. Gao J, **Szymanski-Exner A**, Stowe N, Haaga J, Monitoring Drug Release and Distribution in vivo by Computed Tomography, ASME Summer Bioengineering Conference, 2001.

38. **Szymanski A**, Stowe N, Haaga JR, Gao J, “Development of computed tomography as a non-invasive method of quantifying drug release and distribution in vivo”, poster presentation at the CWRU Biomedical Engineering Research Day, February 2001
39. Qian F, **Szymanski A**, Gao J, Controlled Release PLGA Millirods for Intratumoral Drug Delivery, Society for Biomaterials, 2000.
40. **Szymanski AA**, Stowe N, Haaga JR, Gao J, “Development of computed tomography as a non-invasive method of quantifying drug release and distribution in vivo”, poster presentation at the Biomedical Engineering Society Annual Meeting, Seattle WA, October, 2000
41. **Szymanski AA**, Haaga JR, Stowe N, Basile V, Wilson DL, Salem KA, Gao J, “Fabrication and Characterization of Poly(lactide-co-glycolide) Millirods for Controlled Drug Delivery”, Society for Biomaterials World Congress, 2000.
42. **Szymanski AA**, Stowe N, Haaga JR, Gao J, “Poly(D,L-lactide-co-glycolide) Millirods for Controlled Drug Delivery to Thermally Ablated Liver Tissue”, oral presentation at the CWRU BME Research Day, 2000

CURRENT AND PENDING SUPPORT

COMPLETED AND ACTIVE

Cuyahoga Area Pilot Research Award (PI: Exner)

American Cancer Society, Ohio Division, Inc.

7/1/2003 - 6/30/2005

Injectable Polymer Gels as Delivery Matrixes and Sensitizers for Local Chemotherapy

1R21EB002847 (PI: Exner)

National Institute of Biomedical Imaging and Bioengineering /NIH

9/30/2003 - 8/31/2006

Image-guided Chemotherapy and Radiofrequency Ablation

1R01CA1118399-01A1, (PI: Exner)

National Institutes of Health / NCI

8/1/2006 - 7/31/2011

Functional Polymer Matrixes for Site-Specific Image Guided Drug Delivery.

Presidential Research Initiative Grant (PI: Exner)

Case Western Reserve University

7/1/2005 - 6/30/2008

Ultrasound-Mediated Drug Delivery

Role: Principal Investigator

Supplement to 5P30 043703-17S3 to (PI: S Gerson, Case Comprehensive Cancer Center; PD: JR Haaga)

National Institutes of Health / NCI

10/1/2005 - 9/30/2007

Vascular modulation with or without chemotherapy for enhancement of RF ablation;

Role: Co- Investigator

Grant Number: 1T32EB007509-01 (PI David Wilson, Dept. of Biomedical Engineering)

National Institutes of Health / NIBIB

9/1/07-8/31/2012

Project Title: Interdisciplinary Biomedical Imaging Training Program

Role: Training faculty member

New Investigator Start Up

Department of Radiology, Case Center for Imaging Research, Case Western Reserve University

National Institutes of Health (PI: C. Deng, Dept. of Biomedical Engineering)

9/1/2005-2/28/2007

Sonoporation Effects of Therapeutic Ultrasound;

Role: Co-investigator

PENDING*National Institutes of Health / NCI* (PI: Exner)

Use of Vasoactive Agents to Enhance Radiofrequency Ablation; R21

Role: Principal Investigator

National Institutes of Health / NCI (PI: Gerald Saidel, Dept. Biomedical Engineering)

Tumor Ablation and Adjuvant Therapy with Image Guidance and Model Prediction; R01

Role: Co-investigator

National Institutes of Health / NIBIB (PI: **Exner**)

Enhancement of Tumor Radiofrequency Ablation by Pluronic Block Copolymers; R01

Role: Principal Investigator

National Institutes of Health (PI: J Sohn, Dept. of Radiation Oncology)

The Development of Biodegradable Surgical Markers for Image-Guided Radiotherapy; R01

Role: Co- Investigator, 10% effort

TEACHING EXPERIENCE

Fall 2007	Faculty -- EBME 316, Biomaterials in Drug Delivery Student advisor -- EBME 398, Senior Research Project Group advisor -- EBME 380, Senior Design Project
Spring 2007	Faculty -- EBME 314, Undergraduate Biomedical Laboratory
Fall 2006	Faculty -- EBME 316, Biomaterials in Drug Delivery Student advisor -- EBME 398, Senior Research Project
Spring 2006	Faculty -- EBME 314, Undergraduate Biomedical Laboratory Student advisor (2) -- EBME 398, Senior Research Project
Fall 2005	Primary faculty -- EBME 416, Biomaterials in Drug Delivery Student advisor -- EBME 398, Senior Research Project Group advisor -- EBME 380, Senior Design Project Final project advisor -- EBME 105, Introduction to Biomedical Engineering Imaging panel discussion member - EBME 105, Introduction to Biomedical Engineering
Fall 2004	Student Advisor-- EBME 398, Senior Project
Spring 2004	Grand Rounds, University Hospitals of Cleveland, Department of Radiology (CME 1) Research seminar, UH, Department of Radiology Student Advisor-- EBME 398, Senior Project
Fall 2003	Guest lecture -- EBME 105, Introduction to Biomedical Engineering Student Advisor-- EBME 398, Senior Project
Fall 2002	Series of guest lectures -- EBME 416, Biomolecular Engineering
Fall 2000	Teaching assistant, guest lecturer -- EBME 416, Biomolecular Engineering
Spring 1999	Teaching assistant-- EBME 408, Tissue Engineering

SOCIETY MEMBERSHIP

2005- Controlled Release Society
2004- Radiological Society of North America
2004- American Association of Pharmaceutical Scientists
2001- Society for Biomaterials
2001- Society for Women Engineers
1993- Golden Key National Honor Society

CURRENT RESEARCH INTERESTS

Image guided drug delivery
Radiofrequency ablation (RFA) and local chemotherapy for treatment of solid tumors
Injectable polymer gels as delivery matrixes and sensitizers for local chemotherapy of colorectal cancer
Various polymer applications in interventional radiology
Functional CT assessment of tumor perfusion in response to treatment
Ultrasound-mediated drug delivery