

**BIOGRAPHICAL SKETCH**

| NAME<br><b>Knopp, Michael V., M.D., Ph.D.</b>  | POSITION TITLE<br><b>Chairman and Professor of Radiology and Novartis Chair of Imaging Research</b> |           |                                      |
|--|---|-----------|--------------------------------------|
| EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.) |   |           |                                      |
| INSTITUTION AND LOCATION   | DEGREE<br>(if applicable)   | YEAR(s)   | FIELD OF STUDY                       |
| Capital University, Columbus, OH   |   | 1977-1979 | Chemistry, Physics, Computer Science |
| College of Medicine, University of Saarland, Homburg, Germany  |   | 1979-1980 | Medicine                             |
| College of Medicine, University of Heidelberg  | M.D.  | 1980-1984 | Medicine                             |
| College of Medicine, University of Heidelberg  | Dr. med.  | 1988      | Surgery                              |
| University of Heidelberg, Germany  |   | 1985-1988 | Medical Computer Science             |
| University of Heidelberg, Germany  | Ph.D. (Dr. habil.)  | 1997      | Radiology                            |

**A. Positions and Honors****Academic Appointments**

|              |  |
|--------------|--|
| 1984-1985    | Internship, University Hospitals, Heidelberg, Germany: Internal Medicine, Surgery, Radiology   |
| 1985-1988    | Medical Residency, Radiology/Nuclear Medicine, Diagnostic Imaging Center, Saarbrücken, Germany   |
| 1988-1992    | Clinical Researcher, PET in Oncology Project, German Cancer Research Center, Heidelberg  |
| 1988-1993    | Medical Residency, Radiology/Nuclear Medicine, German Cancer Research Center, Heidelberg   |
| 1990-1991    | Chief, Division of CT and Ultrasound, German Cancer Research Center, Heidelberg, Germany   |
| 1991-2000    | Chief, Division of MRI and Spectroscopy, German Cancer Research Center, Heidelberg   |
| 1996-2000    | Vice Chair, Department of Radiology, German Cancer Research Center, Heidelberg   |
| 1997-present | Associate Professor of Radiology, tenured, University of Heidelberg, Germany   |
| 2000-2001    | Staff Scientist, National Institute of Health, Clinical Center, Diagnostic Radiology Department (while on sabbatical leave from the German Cancer Research Center) |
| 2001-present | Professor of Radiology, Director of Imaging Research, Novartis Chair of Research, Department of Radiology, The Ohio State University, Columbus, OH                 |
| 2002-present | Professor, Department of Biomedical Informatics, The Ohio State University, Columbus, OH   |
| 2002-2004    | Member, College of Medicine Advisory Committee for Faculty Appointments, Promotion and Tenure, The Ohio State University, Columbus, OH                             |
| 2002-present | Chair, Biomedical Imaging Committee, The Ohio State University, Columbus, OH   |
| 2002-present | Professor, Department of Biomedical Engineering, The Ohio State University, Columbus, OH   |
| 2002-present | Member, The Ohio State University Comprehensive Cancer Center, Columbus, OH  |
| 2002-present | Dorothy M. Davis Heart and Lung Research Institute Investigator, The Ohio State University   |
| 2003-present | Professor, Department of Biomedical Physics, The Ohio State University, Columbus, OH   |
| 2004-present | Chairman, Department of Radiology, The Ohio State University, Columbus, OH   |

**Honors and Awards**

## Scientific Poster awards:

|      |  |
|------|--|
|      | German Radiology meeting, 1992; Three-country summit: Ultrasound Diagnostics, 1992; Poster of the Day - American Urological Association, Annual Meeting, 1993; German Congress of Internal Medicine, 1994; European Congress of Radiology (ECR), 1995; Research Symposium 1995; ECR, 3 awards, 1997; ECR; Research Symposium, 1998; ECR, 1999; ESMRMB, 1999; ECR, 2000; ESMRMB, 2000, "magna cum laude"; RSNA, 2000 two "Certificates of Merit" awards; RSNA, 2001 "Certificate of Merit"; RSNA, 2001 "Magna cum laude". |
| 1997 | Contrast Media Research Award, German Roentgen Society   |
| 1997 | ECR, Research Fellowship Award   |
| 1999 | Invitation to the Working Group on Quantitative <i>In Vivo</i> Functional Imaging in Oncology of the National Cancer Institute & the US Public Health Service Office on Women's Health, Washington, DC   |
| 2004 | John K. Lattimer Plenary Lecture and Award, American Urological Association, San Francisco, CA   |

**Selected Recent Additional Professional Activities**

|              |  |
|--------------|--|
| 1990-2001    | Lecturer in Radiology and Radiation Safety, College of Medicine, University of Heidelberg  |
| 1991         | Invitation as "Visiting Professor", Mayo Clinic, Rochester, MN   |
| 1992-present | Certification as Principle Investigating Physician for Medical Research using Radioactive Substances on Humans, Bundesamt für Strahlenschutz, German FDA   |
| 1992         | Congress Secretary, German-Austrian-Swiss Annual Meeting on Ultrasound   |
| 1992         | Invited Speaker at the opening ceremony of the PET-Center at the University of Indiana   |
| 1992-1995    | Coordinator, International Proton Spectroscopy Trial   |
| 1992-1996    | Project Coordinator of the Tumor Center Heidelberg/Mannheim: Project: Functional Tumor Diagnostics using MRT and MRS; Project: Positron Emission Tomography Monitoring of Bronchogenic Carcinoma |
| 1994-present | Vice-Chair, Foundation for the Advancement of Cancer Detection and Therapy, Heidelberg   |
| 1996         | Course in Radiological Pathology, Armed Forces Institute of Pathology, Washington, DC  |
| 1997-1999    | Project Coordinator for the Tumor Center Heidelberg/Mannheim<br>Project: Functional MRI for diagnostic assessment and therapy monitoring   |
| 1998-present | Member, <i>Investigative Radiology</i> Editorial Board   |
| 1999         | Co-Guest Editor, <i>JMRI</i> for the special issues on Contrast Agents   |

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| 1999         | Organizer, International Symposium on MRI Microcirculation, Heidelberg, Germany   |
| 1999         | Invitation to the working Group on Quantitative in vivo functional imaging in oncology of the National Cancer Institute and the US Public Health Service Office on Women's Health |
| 2000         | Invited Advisor, Institution of Medicine at the National Science Foundation   |
| 2000         | Member, ISMRM Workshop in Experimental and Clinical Cancer Research Organizing Committee  |
| 2000         | Chair Elect, Cancer Study Group on Functional Tumor Imaging, MRI  |
| 2000-2001    | Co-Guest Editor, <i>Investigative Radiology</i> , special issues on Contrast Agents   |
| 2000-2002    | Chair, EORTC Study Group on Functional Imaging, MRI   |
| 2001-present | Member, NCI/CCR, Imaging Subcommittee, Animals Models Initiative  |
| 2001         | Co-Chair, NCI/ISMRM Workshop on Higher Field MR in Oncology, Glasgow, Scotland  |
| 2002         | Panelist and Closing Speaker, NCI/National Biomedical Imaging Forum in Oncology, Washington, DC   |
| 2002-present | Consultant and Reviewer, NCI – Intramural and Extramural Program, Multiple Projects   |
| 2002         | Workshop Co-Organizer, In Vivo Functional & Molecular Assessment of Cancer ISMRS, Santa Cruz, CA  |

## B. Selected Publications (selected from >180 publications)

- Essig M, Wenz F, Schoenberg SO, Dubus J, **Knopp MV**, van Kaick G. Arteriovenous malformations: assessment of gliotic and ischemic changes with fluid-attenuated inversion-recovery MRI. *Invest Radiol*, 35(11):689-694, 2000.
- Port RE, **Knopp MV**, Brix G. Dynamic contrast-enhanced MRI using Gd-DTPA: interindividual variability of the arterial input function and consequences for the assessment of kinetics in tumors. *Magn Reson Med*, 45(6):1030-1038, 2001.
- Knopp MV**, Giesel F, Radeleff J, Kobligk H. Bile-tagged 3D MR colonography after exclusive intravenous administration of gadobenate dimeglumine, a contrast agent with partial hepatobiliary excretion. *Invest Radiol*, 36:619-623, 2001.
- Knopp MV**, Giesel FL, Marcos H, Von Tengg-Kobligk H, Choyke P. Dynamic contrast-enhanced magnetic resonance imaging in oncology. *Top Magn Reson Imaging*, 12(4):301-308, 2001.
- Ho VB, Foo TK, Czum JM, Marcos H, Choyke PL, **Knopp MV**. Contrast-enhanced magnetic resonance angiography: technical considerations for optimized clinical implementation. *Top Magn Reson Imaging*, 12(4):283-299, 2001.
- Schoenberg SO, Essig M, Hallscheidt P, **Knopp MV**, Yuh WT. Multiphase magnetic resonance angiography of the abdominal and pelvic arteries: results of a bicenter multireader analysis. *Invest Radiol*, 37(1):20-28, 2002.
- Schoenberg SO, **Knopp MV**, Londy F, et al. Morphologic and functional magnetic resonance imaging of renal artery stenosis: a multireader tricenter study. *J Am Soc Nephrol*, 13(1):158-169, 2002.
- Choyke P, **Knopp MV**, Libutti S. Special technique for imaging blood flow to tumors. *Canc J*, 8(2):109-118, review, 2002.
- Knopp MV**, Himmelhan N, Fadeleff J, Junkermann H, Hess T, Sinn HP, Brix G. Comparison of methods for quantifying contrast enhancement exemplified by dynamic MRI mammography. *Radiologe*, 42(4):280-290, 2002.
- Costouros N, Lorang D, Zhang Y, Miller S, Diehn F, Hewitt S, **Knopp MV**, Li K, Choyke P, Alexander H, Libutti S. Microarray gene expression analysis of murine tumor heterogeneity defined by dynamic contrast-enhanced MRI. *Acta Radiol*, 1(3):301-308, 2002.
- Knopp MV**, Schoenberg SO, Rehm C, Floemer F, von Tengg-Kobligk H, Bock M, Hentrich HR. Assessment of gadobenate dimeglumine for magnetic resonance angiography: phase I studies. *Invest Radiol*, 37(12):706-715, 2002.
- Choyke PL, Dwyer AJ, **Knopp MV**. Functional tumor imaging with dynamic contrast-enhanced magnetic resonance imaging. *J Magn Reson Imaging*, 17(5):509-520, 2003.
- Choyke P, **Knopp MV**. Pseudohypocalcemia with MRI contrast agents: a cautionary tale. *Radiology*, 227:627-8, 2003.
- Essig M, Waschkes M, Wenz F, Debus J, Hentrich HR, **Knopp MV**. Assessment of brain metastases with dynamic susceptibility-weighted contrast-enhanced MR imaging: initial results. *Radiology*, 228(1):193-199, 2003.
- Knopp MV**, Giesel FL, Von Tengg-Kobligk H, Radeleff J, Requardt M, Kirchin MA, Hentrich HR. Contrast-enhanced MR angiography of the run-off vasculature: intraindividual comparison of gadobenate dimeglumine with gadopentetate dimeglumine. *J Magn Reson Imaging*, 17(6):694-702, 2003.
- Knopp MV**, Bourne MW, Sardanelli F, Wasser MN, Bonomo L, Boetes C, Muller-Schimpfle M, Hall-Craggs MA, Hamm B, Orlicchio A, Bartolozzi C, Kessler M, Fischer U, Schneider G, Oudkerk M, The WL, Gehl HB, Salerio I, Pirovano G, La Noce A, Kirchin MA, Spinazzi A. Gadobenate dimeglumine-enhanced MRI of the breast: analysis of dose response and comparison with gadopentetate dimeglumine. *Am J Roentgenol*, 181(3):663-676, 2003.
- Wikstrom J, Wasser MN, Pattynama PM, Bonomo L, Hamm B, Del Maschio A, **Knopp MV**, Marchal G, Barentsz JO, Oudkerk M, Hentrich HR, Dapra M, Kirchin MA, Shen N, Spinazzi A, Ahlstrom H. Gadobenate dimeglumine-enhanced magnetic resonance angiography of the pelvic arteries. *Invest Radiol*, 38(8):504-515, 2003.
- Knopp MV**, Von Tengg-Kobligk H, Choyke PL. Functional magnetic resonance imaging in oncology for diagnosis and therapy monitoring. *Mol Canc Ther*, 2(4):419-426, 2003.
- Schoenberg SO, Aumann S, Just A, Bock M, **Knopp MV**, Johansson LO, Ahlstrom H. Quantification of renal perfusion abnormalities using an intravascular contrast agent (part 2): Results in animals and humans with renal artery stenosis. *Magn Reson Med*, 49(2):288-298, 2003.
- Knopp MV**, Runge VM, Essig M, Hartman M, Jansen O, Kirchin MA, Moeller A, Seeberg AH, Lodemann KP. Primary and secondary brain tumors at MRI imaging: bicentric intraindividual crossover comparison of gadobenate dimeglumine and gadopentetate dimeglumine. *Radiology*, 230(1):55-64, 2004.
- Prince M, Choyke P, **Knopp MV**. More on pseudo-hypocalcemia and gadolinium-enhanced MRI. *NEJM*, 350:87-8, 2004.

**C. Research Support****Ongoing Research Support**

- 04/01/07-04/04/07 CALGB-Cancer and Leukemia Group B  
Title: PET Core Laboratory  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 05/21/04-1/31/06 Novartis  
Title: A randomized, multicenter, open label, phase II study to evaluate the safety, tolerability, pharmacokinetics and the effects on liver iron concentration of repeated doses of 10 mg/kg/day of ICL670 relative to deferoxamine in sickle cell disease patients with transfusional hemosiderosis  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 07/15/04-12/31/06 Novartis  
Title: A phase 1A, two-arm, multicenter, dose-escalation study of LBH589B administered orally on two dose schedules in adult patients with advanced solid tumors or non-Hodgkin's lymphoma  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 07/10/03-01/10/07 Biomedical Research Technology Transfer Fund ODOD AGMT TECH 03-051  
Title: Biomedical Imaging and Biomedical Structural, Functional and Molecular Imaging Enterprise and Wright Center for Innovation in Biomedical Imaging  
**PI: Michael V. Knopp, M.D., Ph.D.**  
*An enterprise of three partners, The Ohio State University, Case Western Reserve University, and Ohio-based Philips Medical Systems, to leapfrog biomedical imaging as a key enabling technology in the State of Ohio for biomedical research and medical care.*
- 10/20/02-12/31/04 Protocol BR1-071  
Title: Clinical Phase III Ultrasonography – Characterization of Focol Liver Lesions Using SonoVue® Enhanced Ultrasonography  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 03/29/04-06/30/05 Bracco  
Title: A Phase III Multinational, Multicenter Study to Evaluate the Safety and Efficacy of Multihance- Enhanced MRA in the Assessment of the Foot Arteries  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 05/04/04-05/31/05 Berlex  
Title: Multicenter, open-label study of the safety (open-label) and efficacy (open-label and blinded reader) of a single administration of approximately 0.1 mmol/kg of Magnevist® Injection-enhanced magnetic resonance arteriography (MRA) and 2-dimensional-time-of-flight (2D-TOF)  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 06/09/03-06/09/05 Novartis  
Title: Imaging core lab service and image assessment for clinical trial  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 04/01/04-06/30/05 Bracco  
Title: Phase IIIB, Double-Blind, Multi-Center, Randomized, Cross-Over Study to Compare 0.10 mmol/kg of Multihance with 0.10 mmol/kg of agnevist in MRI of the Central Nervous System  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 02/01/03-01/31/06 Biomedical Research Technology Transfer Fund BRTT02-0001  
Title: Novel contrast agents for enhanced MRI imaging of coronary artery disease (CAD)  
**PI: Michael V. Knopp, M.D., Ph.D.**
- 10/29/04-2/28/07 ODOD AGMT TECH 04-049  
Title: Ohio Cancer Therapy and Research Consortium  
PI: Michael Caligiuri, M.D.  
**Co-I: Michael V. Knopp, M.D., Ph.D.**  
*Creation of a comprehensive and synergistic partnership of four enterprises: The Ohio State University, Battelle Memorial Institute, Zivena, Inc., and Siemens Medical Solutions, for a comprehensive program in the prevention, detection and treatment of lung cancer.*
- 03/1/04-01/31/05 NIH/NCI 5 U01 CA76576-07  
Title: Phase I Trials of Anti-cancer Agents  
PI: Michael Grever, M.D.  
**Co-I: Michael V. Knopp, M.D., Ph.D.**  
*This project conducts correlative studies to evaluate clinical outcomes in the context of basic science observations. Studies done under this project will advance new therapies from the bench to the bedside and provide insights into cancer biology.*
- 05/01/04-04/30/05 Max Kade Foundation, Inc.  
Title: Cardiovascular Imaging: Volunteer, Phantom (as well as Patient Studies), Data Analysis, and Project Development  
**PI: Michael V. Knopp, M.D., Ph.D.**

08/01/03-07/31/05            NIH/NIGMS/NIBIB 1 P20 EB000591-01A1  
Title: Center for Grid-enabled Medical Image Analysis  
PI: Joel Saltz, M.D., Ph.D.  
**Co-I: Michael V. Knopp, M.D., Ph.D.**

*The goal of this planning grant is to develop the infrastructure for an interdisciplinary center that will promote multidisciplinary research involving acquisition and analysis of very large, distributed collections of image data.*

**Completed Research Support**

11/01/02-01/30/04            EPIX Medical, Inc. 7615200  
Title: Clinical Phase III Magnetic Resonance Angiography: Renal Artery Disease MRA  
**PI: Michael V. Knopp, M.D., Ph.D.**

*The goals of these research activities are focused on the clinical development and assessment of new imaging technologies and contrast agents for cardiovascular, oncologic, and neuro-imaging applications.*

11/27/02-12/31/03            B19036-062  
Title: Safety and Efficacy of Multihance® in Contrast-enhanced Magnetic Resonance Angiography in Assessment of Carotid Arteries Using Digital Subtraction Angiography as Standard  
**PI: Michael V. Knopp, M.D., Ph.D.**

07/01/02-01/03/04            Bracco Diagnostics, Inc.  
Title: Clinical Phase III Magnetic Resonance Angiography: Pelvic MRA  
**PI: Michael V. Knopp, M.D., Ph.D.**

10/15/02-12/30/03            Bracco Diagnostics, Inc.  
Title: Clinical Phase III Ultrasonography: Liver Lesions Characterization  
**PI: Michael V. Knopp, M.D., Ph.D.**

09/02/02-12/30/03            Bracco Diagnostics, Inc.  
Title: Clinical Phase III Magnetic Resonance Angiography: Carotid MRA  
**PI: Michael V. Knopp, M.D., Ph.D.**

1996-2001                      Cancer Center, Heidelberg/Mannheim  
Title: Functional Imaging  
**PI: Michael V. Knopp, M.D., Ph.D.**

1999-2001                      German Cancer Foundation  
Title: Pharmacokinetic Analysis of Dynamic MR  
**PI: Michael V. Knopp, M.D., Ph.D.**

2002-2003                      Schering Plough  
Title: Measurement of Prostate Volume during Therapy  
**PI: Michael V. Knopp, M.D., Ph.D.**