Significant Accomplishments

Safety Initiatives Expand

Our “Right Patient, Right Exam” initiative, designed to decrease inappropriate imaging from order entry errors, prevented more than 750 errors from reaching patients in fiscal 2013.

An accurate history is known to be an essential component to optimal radiographic interpretation, yet is present in only about 60 percent of physician orders. Our “What, When, Where” initiative empowered our technologists to fill in the missing components of the history. This has led to a sustained level of 95 percent of all studies having an appropriate history, allowing our physicians to make more accurate and complete interpretations.

This year’s efforts to minimize pediatric imaging radiation exposure have focused on radiography, which accounts for 70 percent of all imaging studies in children. While our doses were already low, further adjustments in techniques have allowed us to cut doses by 50 to 75 percent without compromising diagnostic quality.

Advances in Airway and Pulmonary Imaging

In collaboration with Pulmonology, Otolaryngology, Plastic Surgery and others, we have developed an integrative approach for the diagnosis and treatment of airway diseases that combines CT and MRI to make
more precise, non-invasive diagnoses. Our engineering partners at the University of Cincinnati have applied computational fluid dynamics (CFD) and flow structure interaction (FSI) modeling to these imaging data sets to achieve new insights into the mechanisms of airway diseases. This analysis also allows virtual treatments to be modeled, allowing proposed interventions to be assessed prior to actual surgery and thus improving the likelihood of a successful outcome.

Jason Woods, PhD, joined Imaging Research Center this year with faculty appointments in Pulmonary Medicine, Radiology, and Developmental Biology. Woods and his team bring an entirely new area of pulmonary MR research to Cincinnati Children’s. Hyperpolarized gas imaging allows detailed functional and structural assessment of the healthy and disease lung, and advances in MRI pulse sequences promise to provide anatomic detail that may ultimately replace CT (and its attendant radiation) in the evaluation of the pediatric chest.

**Expanded Informatics Capability**

Our Radiology Informatics group has developed the infrastructure needed to support imaging-based research studies within the hospital and throughout the country. Improvements include a research Picture Archiving and Communication System (PACS) and a reliable method for anonymizing research image datasets.

Our team also increased the archive space, implemented disaster recovery capabilities, and created a method for secure access to the research system by remote users. These enhancements have allowed researchers from Cincinnati Children’s to lead multi-institutional trials in an attempt to answer questions as varied as “Are there differences in the appearance of diffuse intrapontine gliomas in patients who are long-term versus short-term survivors?” and “What is the diagnostic reference range for radiation dose for CT examinations of the abdomen?”

The Radiology Informatics group also produced its own research, and were recognized with a second place Innovation Award from the Society of Imaging Informatics in Medicine.

**Research Highlights**

**Imaging Research Center**

Primary investigators in the Imaging Research Center received $2 million in new direct and indirect funding this year. Significant expansion in the breadth and depth of research capabilities has occurred with the installation of a new 1.5T Philips MRI, renovations to allow the installation of hyperpolarizers for 3He and 129Xe MR imaging, and the acquisition of new interventional guidance technologies. Research collaborations with multiple other divisions continue, and these investments in infrastructure will strengthen and expand these collaborations.

**Pediatric Neuroimaging Research Consortium**

The C-MIND project (Cincinnati MR Imaging of NeuroDevelopment), an NICHD-sponsored contract to provide a normative database of brain structural, functional, and perfusion MRI, has successfully scanned over 140 children and teens ages 0-18. The Pediatric Neuroimaging Research Consortium (PNRC) has developed methods for MRI scanning in infants and young children without sedation, and over 2/3 of scans attempted in children age five and under are successful using this protocol. This database will be made available to the scientific community in fall of 2013.
The PNRC, with the Division of Neurology, recently recruited Dr. Darren Kadis, PhD, a neuropsychologist and MEG (magnetoencephalography) scientist with research interests in language and cognitive development. Dr. Kadis’ expertise will allow the PNRC to expand further our multimodality neuroimaging research.

NICU MRI

There were further developments and refinements to our Neonatal ICU MRI scanner, still the only one of its kind in the world. Over 150 patients have now been imaged successfully, most without the need for sedation. This capability is leading to improved clinical care, and is also allowing investigation into neurological and abdominal conditions that will lead to diagnostic and treatment improvements in the future. A paper describing our initial experiences won the Slovis Award for best basic science paper in the journal *Pediatric Radiology*. Further advancement of this program will be aided by a recently obtained Innovation award.

**Significant Publications**


As treatments for muscular dystrophy come closer to reality, it is important to have non-invasive methods for monitoring disease progression or improvement. Imaging changes may occur prior to clinically detectable functional changes, and this paper advances these methodologies.


This is an extension of a discovery at Cincinnati Children's Hospital of a specific brain spectroscopic finding of creatine transported deficiency in a cohort of boys with developmental delay. The current study evaluates treatment effects in a mouse model, which promises to lead to an effective clinical treatment in patients.


This paper presents a new approach to high-speed magnetic resonance imaging (MRI) that uses all the data acquired in a multiscan imaging session. This approach accelerates MRI data acquisition by statistically estimating correlation.


Comprehension of spoken narratives requires coordination of multiple language skills. As such, for normal children narrative skills develop well into the school years and, during this period, are particularly vulnerable in the face of brain injury or developmental disorder. The dynamic changes observed in this longitudinal fMRI study support the increasing role of bilateral Brodmann areas 21 and 22 in narrative comprehension, involving non-domain-specific integration in order to achieve final story interpretation. The presence of a continued linear development of this area throughout childhood and teenage years with no apparent plateau, indicates that full maturation of narrative processing skills has not yet occurred and that it may be delayed to early adulthood.


Developed entirely by the staff and faculty of the IRC, the dedicated NICU MRI remains a unique system in the
The paper won the Thomas Slovis Best Scientific Paper Award from the journal *Pediatric Radiology*

### Division Publications

16. Calvo-Garcia MA, Kline-Fath BM, Rubio El, Merrow AC, Guimaraes CV, Lim FY. **Fetal MRI of cloaca...**


71. Meyers AB, Laor T, Zbojniewicz AM, Anton CG. MRI of radiographically occult ischial apophyseal...


### Faculty, Staff, and Trainees

#### Faculty Members

**Brian D. Coley, MD**, Professor  
**Leadership** Director and Radiologist-in-Chief; Endowed Chair, The Frederic N. Silverman Chair for Pediatric Radiology  
**Research Interests** Ultrasound, imaging care delivery

**Bernadette L. Koch, M.D.,** Professor  
**Leadership** Associate Chief, Academic Affairs  
**Research Interests** Imaging the pediatric head and neck

**Blaise V. Jones, MD**, Professor  
**Leadership** Associate Chief, Clinical Operations; Division Chief, Neuroradiology; Division Co-Chief, MRI  
**Research Interests** Pediatric neuroradiology, neuro-oncology and crebrovascular diseases

**Todd A. Abruzzo, MD**, Associate Professor  
**Leadership** Chief, Pediatric Interventional Neuroradiology  
**Research Interests** Cerebrovascular disease, childhood stroke, aneurysms, intra-arterial chemotherapies, vascular malformations, neurovascular interventions

**Christopher G. Anton, MD**, Assistant Professor  
**Leadership** Associate Director, Radiology Residency Program; Chief Division of Radiography  
**Research Interests** Musculoskeletal diseases
Diane S. Babcock, MD, Professor Emerita

Research Interests: Childhood stroke, neoplasms, sickle cell disease, brain perfusion imaging

Williams S. Ball, MD, Professor

Research Interests: Childhood stroke, neoplasms, sickle cell disease, brain perfusion imaging

Alan S. Brody, MD, Professor

Leadership: Associate Director, Clinical Radiology Research; Chief, Division of Thoracic Imaging

Research Interests: Imaging of the chest in cystic fibrosis and in childhood diffuse lung disease. He directs the Center for Diagnostic Imaging of the Therapeutic Development Network

Maria A. Calvo-Garcia, MD, Assistant Professor

Research Interests: Fetal development and malformations including cloaca and other ano-rectal malformations, obstructive uropathy, skeletal dysplasias, vascular birthmarks, etc

Marquerite M. Care, MD, Assistant Professor

Research Interests: Traumatic brain injury, child abuse, CT neuroimaging

Kim M. Cecil, PhD, Professor

Research Interests: Application of MR spectroscopy and imaging in several populations by characterizing the features of inborn errors in metabolism, attention-deficit hyperactivity disorder (ADHD), traumatic brain injury, and evaluating the effects of environmental neurotoxicants

Eric J. Crotty, MD, Assistant Professor

Leadership: Director, Pediatric Radiology Fellowship Program

Research Interests: Cardiothoracic radiology, specifically childhood interstitial lung disease and also resident education

Mark DiFrancesco, PhD, Assistant Professor

Research Interests: Imaging structure and function of brain networks impacted by behavioral and disease-related challenges

Charles L. Dumoulin, PhD, Professor

Leadership: Scientific Director, Imaging Research Center

Research Interests: Physics and engineering of Magnetic Resonance, MRI of neonates, MR-guided vascular interventions, and MR-guided Focused Ultrasound Therapy

Kathleen H. Emery, MD, Professor

Leadership: Division Co-Chief, Musculoskeletal Imaging

Research Interests: Musculoskeletal imaging and sports medicine

Robert J. Fleck, MD, Assistant Professor

Leadership: Division Chief, Cardiac MRI

Research Interests: CT and MR of the cardiopulmonary system.

Michael J. Gelfand, MD, Professor

Leadership: Division Chief, Nuclear Medicine

Research Interests: New applications of hybrid imaging (PET/CT, SPECT/CT, PET/MRI) in pediatrics, and radiation dose reduction in nuclear medicine and hybrid imaging

Randy O. Giaquinto, Instructor

Research Interests: MR coil engineering
Marilyn J. Goske, MD, Professor

**Leadership** Chair, Educational Council; Endowed Chair, The Comin Benton Chair for Radiology Education

**Research Interests** Radiation protection for children, communication, education for radiologists, technologists and fellows.

Kathy J. Helton-Skally, MD, Assistant Professor

Scott Holland, PhD, Professor

**Leadership** Director, Pediatric Neuroimaging Research Consortium; Director, Communication Sciences Research Center

**Research Interests** Advanced neuroimaging applications of MRI in pediatrics with a concentration on functional MRI of language, hearing and computational models of neural connectivity

Neil D. Johnson, MD, Professor

**Leadership** Endowed Chair, The Neil D. Johnson Chair for Radiology Informatics; Medical Director, Vascular Access

**Research Interests** Interventional percutaneous image guided treatment of benign bone tumors such as Aneurysmal Bone Cyst and Osteoid Osteoma

Hee Kyung Kim, MD, Assistant Professor

**Research Interests** Advanced MR techniques in pediatric MR studies, neuromuscular disease, and cartilage image

Beth M. Kline-Fath, MD, Associate Professor

**Leadership** Division Chief, Fetal Imaging

**Research Interests** Fetal MRI, fetal ultrasound and neuroimaging

Marcia Komlos, Instructor

**Research Interests** Neuroradiology and fetal imaging

Steven J. Kraus, MD, Associate Professor

**Leadership** Division Chief, Fluoroscopy

**Research Interests** Gastrointestinal malformations

Kamlesh U. Kukreja, MD, Instructor

**Research Interests** Vascular interventions (Arterial and venous thrombolysis, IVC filters, renal artery angioplasty)

David Larson, MD, Associate Professor

**Leadership** Chief, Quality Improvement; Endowed Chair, The Janet L. Strife Chair for Radiology Quality & Safety

**Research Interests** Healthcare Quality Improvement, patient safety, CT dose reduction and image optimization

Tal Laor, MD, Professor

**Leadership** Division Co-Chief Musculoskeletal Imaging; Endowed Chair, The William S. Ball Chair for Radiology Research

**Research Interests** Skeletal injuries to the child, congenital abnormalities, and normal and abnormal bone growth and development
James L. Leach, MD, Associate Professor
Research Interests Epilepsy, functional MRI, neoplasms, cerebrovascular disease, brain perfusion imaging, diffusion imaging and image fusion

Greg Lee, PhD, Assistant Professor
Research Interests High-speed MR imaging

Diana Lindquist, PhD, Associate Professor
Research Interests Metabolic effects of drugs used to treat psychiatric illness

Yu Li, PhD, Assistant Professor
Research Interests Technological development and clinical applications of high speed MR imaging and spectroscopy including RF coil array technology for clinical MRI

Carl (Arnold) Merrow, Jr, M.D., Assistant Professor
Research Interests Pediatric musculoskeletal and fetal imaging including musculoskeletal neoplasms and vascular lesions, and rheumatologic imaging

Michael P. Nasser, MD, Assistant Professor

Alan E. Oestreich, MD, Professor Emeritus
Research Interests Musculoskeletal plain imaging; bone dysplasias; metabolic bone disease; umbilical vein catheterization; postgastric magnetopathy; sequential perception

Sara M. O'Hara, MD, Professor
Leadership Division Chief, Ultrasound
Research Interests Cutting edge ultrasound techniques and equipment, genitourinary imaging, and newborn imaging

Manish N. Patel, MD, Assistant Professor
Research Interests Diagnosis and treatment of vascular malformation, pediatric PICC placement, and pre-operative evaluation of patient with anorectal malformation

Daniel J. Podberesky, MD, Assistant Professor
Leadership Division Chief, Thoraco-Abdominal Imaging
Research Interests Optimization of CT radiation dose and image quality, advanced CT and MR gastrointestinal tract

John M. Racadio, MD, Professor
Leadership Division Chief, Interventional Radiology; Director IR Research Lab
Research Interests Viral oncolytic therapy, 3D image fusion and intervention and radiation safety

Mantosh Rattan, MD, Assistant Professor
Research Interests Thoracic imaging, neonatal abdominal MRI

Susan E. Sharp, MD, Assistant Professor
Research Interests Pediatric nuclear medicine, focusing on SPECT/CT and PET/CT.

Keith Strauss, Assistant Professor
Leadership Clinical Imaging Physicist
Research Interests Radiation dose reduction, image optimization

Jean Tkach, PhD, Associate Professor
Research Interests: Development, implementation and optimization of neonatal MRI acquisition techniques

Alexander J. Towbin, MD, Associate Professor

Leadership: Director, Radiology Informatics

Research Interests: Radiology informatics; cancer imaging and abdominal imaging

Daniel B. Wallihan, MD, Assistant Professor

Research Interests: Cardiovascular imaging and education

Janaka Wansapura, PhD, Associate Professor

Research Interests: MR imaging of familial cardiomyopathy in human and in transgenic animal models; vascular compliance, MR guided thermo-therapy and fat/water decomposition

Patrick Winter, PhD, Assistant Professor

Research Interests: Molecular imaging of cancer and cardiovascular disease, multi-nuclear imaging and spectroscopy, tracking USPIO labeled cell migration, and activatable MRI contrast agents

Weihong Yuan, PhD, Assistant Professor

Research Interests: Diffusion tensor imaging in clinical and experimental hydrocephalus and application of various imaging techniques in children with traumatic brain injury, epilepsy and other neurological disorders

Andrew M. Zbojniewicz, MD, Assistant Professor

Research Interests: Musculoskeletal imaging, US-guided therapy

Joint Appointment Faculty Members

Michael Taylor, MD, Assistant Professor (Cardiology)

Research Interests: Cardiovascular imaging

Jennifer J. Vannest, PhD, Assistant Professor (Neurology)

Research Interests: Neuroimaging of language development and language function in neurological disorders

Clinical Staff Members

Suraj Serai, PhD,
Clinical MR Physicist

Trainees

Tangayi Githu, MD, PL6, University of Miami, Jackson Memorial Hospital, Miami, FL
C.. Matthew Hawkins, MD, PL6, University of Cincinnati, Cincinnati, OH
Jennifer H. Johnston, MD, PL6, Tulane University School of Medicine, New Orleans, LA
Amy Kolbe, MD, PL6, Mayo Clinic, Rochester, MN
Jennifer Kucera, MD, PL6, University of South FL, Tampa, FL
Lisa LaForest, MD, PL6, University of Minnesota, Minneapolis, MN
Luke Linscott, MD, PL6, Mallinckrodt Institute, St. Louis, MO
Janice McDaniels, MD, PL6, University of Cincinnati, Cincinnati, OH
Francis R. Pianki, DO, PL6, Grandview Hospital, Dayton, OH
Yanerys Ramos, MD, PL6, UCLA Medical Center, Los Angeles, CA
Amy Rowell, MD, PL6, Louisiana State University HSC, Shreveport, LA
Lilly L. Wang, MD, PL7, Prince of Wales/Sydney Childen’s Hospitals, Randwick Australia
Shannon N. Zingula, MD, PL6, Mayo Clinic, Rochester, MN
Division Collaboration

Cancer and Blood Disease; Radiology » Maureen O'Brien, Courtney Blank, Jenny Thomas-Quinn, Christine Phillips, Laurie Jean Grimme, Lars Wagner, Megan Westendorf, Karen Burns, Ulie Plummer, Donna Jackson, Mariko DeWire, Beth Ann Stockman, Adrienne Hammill, Andrea Ferris, Mary Suhre, Normal Woolum, Carrye Cost, Jenavieve Kirkendall, Jonathan Fisk, Kathleen Dorris, Maryam Fouladi, Lane Satterthwaite, Laura Mayer, Dennis Adams, Cara Wiburn, Susan Sharp, Brian Weiss, Lori Backus, Julie McDonald, Lionel Chow, and Stacey Crane

Expanded Access MIBG

Neurology; Radiology » Michelle Rodgers, Pawel Matykiewicz, Lili Miles, Hansel Greiner, Hisako Fujiwara, Douglas Rose, Naomi Van Horn, James Leach, Jeffrey Tenney, Lori Heflin, John Pestian, Todd Arthur, Anna Weber Byars, Leonid Rozhkov, Barbara Hallinan, Michael Gelfand, Nicole Inman, Leslie Reed, Tracy Glauser, Sally Monahan, April Flannery, Michele Turner, Cindy Wesolowski, Francesco Mangano, Diego Morita, Paul Horn, Katherine Holland-Bouley, Shannon Standridge, Elizabeth Skulas, and Jody Hessling

Seizure Database.

Oncology; Radiology » Michael Gelfand, Timothy Cripe, Susan Sharp, and Abubakar Durrani

Changes on PET and CT Imaging After Limb Salvage Surgery for Bone Tumors

Cancer and Blood Diseases; Radiology » Maureen O'Brien, Courtney Blank, Karen Burns, Michael Grimley, Lars Wagner, Laurie Jean Grimme, Christine Philips, Parinda Mehta, Jenny Thomas-Wuinn, Stacey Crane, Julie Plummer, Donna Jackson, Mariko DeWire, Stella Davies, Beth Ann Stockman, Sonata Jodele, Mary Suhre, Norma Woolum, Carrye Cost, Jenavieve Kirkendall, Kathleen Dorris, Maryam Fouladi, Lane Satterthwaite, Laura Mayer, Denise Adams, Cara Wiburn, Susan Sharp, Brian Weiss, Lori Backus, Julie McDonald, Siri Steiner, and Lionel Chow

NANT 2001-02

Cardiothoracic Surgery; Otolaryngology; Radiology » Rupa Radhakrishnan, Robert Fleck, Lane Donnelly, Peter Manning, and Michael Rutter

Spectrum of Imaging Findings of Complete Tracheal Rings (Congenital Tracheal Stenosis)

Gastroenterology; Biostatistics and Epidemiology; Radiology » Dan Podberesky, Lee Denson, Dana Dykes, Shelia Salisbury, Alex Towbin, and Dan Wallihan

CT Enterography in Pediatric and Adolescent Crohn Disease Patients

Pathology; Pediatric General and Thoracic Surgery; Radiology » Maria Calvo, Eva Rubio, Anita Gupta, Denise Adams, Tim Crombleholme, Constance Bitters, Beth Kline-Fath, Foong Yen Lim, and Tal Laor

Prenatal Diagnosis of vascular birthmarks: Soft Tissue Vascular Tumors and Malformations

Biostatistics; Epidemiology; Radiology » Steven Kraus, Gary Halverson, Shelia Salisbury, and

Air reduction enema for ileocolic intussusception. What is our success rate? What factors influence failure of this technique?

Clinical Effectiveness; Education and Training Research; Radiology » Marilyn Goske, Seth Hall, Keith Mandal, and Rebecca Phillips

Image Gently: A National Web-based Practice Quality Improvement Module in CT Safety for Children-Built-In Survey Analysis

Cancer and Blood Diseases; Radiology » Michael Gelfand, Susan Sharp, and Michael Absalon

Dose Reduction in Follow-up PET/CT imaging of Lymphoma: When does Localization CT Actually Provide Additional Diagnostic Information?

Cancer and Blood Diseases; Radiology » Michael Gelfand, Chris Anton, Hong Yin, Susan Sharp, and Brian Weiss
Detection of Malignant Peripheral Nerve Sheath Tumor (MPNST) by 2-fluoro-2-deoxyglucose (FDG) PET in Patients with Neurofibromatosis Type 1 (NF1)

Cancer and Blood Diseases; Radiology » Rashni Dasgupta, Lars Wagner, Donna Jackson, Joel Sorger, Norma Woolum, Carrye Cost, Hong Yin, Jonathan Fisk, Gregory Tiao, Lane Satterthwaite, Laura Mayer, Cara Wibum, Susan Sharp, Michael Gelfand, Renee Doughman, Erin McGuire, Anusua Dasgupta, Tal Laor, Brian Turpin, Daniel von Allmen, and Rajaram Nagarajan

Sentinel Lymph Node Biopsy

Pediatric General and Thoracic Surgery; Radiology » Beth Kline-Fath, Foong-Yen Lim,, Carl Merrow, Carolina Guimaraes, Jeremy Neum, Maria Calvo, and Connie Bitters

Spectrum of amniotic band imaging findings with fetal MR

Pediatric General and Thoracic Surgery; Radiology » Eva Rubio, Foong-Yen Lim, Monira Habli, Carolina Guimaraes, and Maria Calvo-Garcia

Fetal Magnetic Resonance Imaging Features of Fetal Mediastinal Teratomas

Pediatric General and Thoracic Surgery; Radiology » Maria Calvo-Garcia, Foong-Yen Lim, Beth Kline-Fath, and Carl Merrow

Fetal MRI Findings in OEIS Complex

Oncology; Radiology » Jennifer Reed, Sara O'Hara, Sundeep Keswani, Nicole McClanahan, Jarrod Peebles, Beth Schwartz, Bin Huang, Alice King, Andrea Kachelmeyer, Jonathan Gagi, Chen Chen, Alison Damon, Michael Bennett, Richard Thomas Strait, Jill Huppert, Melanie Houchell, Regina Taylor, and Beth Schwartz

Female Lower Quadrant Abdominal Pain.

Biostatistics and Epidemiology; Emergency Medicine; Radiology » Marilyn Goske, Dianne Hater, Steve Kraus, Catherine Leopard, Shelia Salisbury, and Lisa Vaughn

Assessing Parents' Medical Literacy in Radiologic Fluoroscopic Procedures Before and After an Informational Brochure about the Procedure.

Pediatric Neurosurgery; Division of Nephrology; Radiology » Todd Abruzzo, James Leach, Francesco Mangano, John Bissler, and Blaise Jones

Phenotypes Among Children With Intracranial Arterial Aneurysms.

Hematology; Radiology » Michael Gelfand, Joseph Palumbo, and Susan Sharp

FDG PET in Langerhans Cell Histioctysis.

Cancer and Blood Diseases; Radiology » Alexander Towbin, James Geller, Art Meyers, Amy Kolbe, and Dan Podberesky

Use of gadoxetate disodium in the diagnosis of pediatric hepatic lesions.

Cancer and Blood Disease; Biostatistics and Epidemiology; Radiology » David Larson, Janet Adams, Sara O'Hara, Beth Schnell, Charles Quinn, and David Dow

Comparison of the Toshiba Aplio Scanner to the Siemens Acuson Sequoia Scanner for Transcranial Doppler Ultrasonographic Detection of Cerebral Blood Flow Velocities.

Cancer and Blood Disease; Radiology » Susan Sharp, Michael Gelfand, and Michel Absalan

Altered FDG Uptake patterns in Pediatric Lymphoblastic Lymphoma Patients.

Oncology; UC Radiation Safety Office; Radiology » Michael Gelfand, Lisa Lemen, Victoria Morris, Brian Turpin, and Brian Weiss

Minimizing nuclear medicine technologist radiation exposure during 131I-MIBG Therapy.
FDG PET Appearance of Local Recurrences of Malignant Bone Tumors After Limb Salvage Procedures.

Sequence Development and Optimization on Clinical MR Scanners.

Quantitative Evaluation of the cartilage cap of osteochondromas: T2 relaxation time mapping and pathologic correlation.

Radiology Findings in Patients with hemophagocytic lymphohistiocytosis.

Predictive Findings of Appendicitis on Ultrasound.

MRI of Epiphyseal and Non-Epiphyseal Ends of Long Bones of the Hands and Feet in Children.

Diagnostic Tools for Detecting Pneumonia in Children.

Hepatic Imaging Abnormalities after Fontan Palliation.

Imaging-Pathology Correlations in Pediatric Epilepsy.

Retrospective Comparison of T2* and Ferriscan Analysis Methods for Estimating Liver Iron Content.

Prenatal evaluation of fetal lower urinary tract obstruction: imaging findings to define underlying etiology.

Liver Magnetic Resonance Elastography-Clinical Study in Children.
Post-Operative Cerebral Venous Thrombosis-Case Series and Literature Review.

**Pediatric General and Thoracic Surgery; Pediatric Urology; Radiology** » Maria Calvo-Garcia, Alberto Pena, Marc Levitt, Andrea Bischoff, Beth Kline-Fath, and Pramod Reddy

- Prenatal diagnosis of variants of the exstrophy-epispadias complex (Covered cloacal exstrophy variants).

**Cancer and Blood Disease; Radiology** » Andrew Trout, Michael Gelfand, Susan Sharp, and Brian Turpin

- Marrow stimulatory effects of granulocyte colony stimulating factors and their effect on PET Scans.

**Gastroenterology; Radiology** » Tom Lin, Sara O'Hara, and Albert Feng

- Normograms for common bile duct diameter in the pediatric population.

**Gastroenterology; Cardiology; Radiology** » Dan Wallihan, Kathleen Campbell, Bradley Marino, Dan Podberesky, and Serai Suraj

- Liver Elastography as a marker for progressive hepatic disease and failing Fontan physiology.

**Neurology; Neurosurgery; Radiology** » James Leach, Anan Weber Byars, Hansel Greiner, Craig Hansen, Darren Kadis, and Francesco Mangano

- fMRI in Pediatric Epilepsy Surgery

**Otolaryngology; Pulmonary Medicine; Radiology** » Robert Fleck, Robin Cotton, Ravindra Elluru, Sara Halula, Daniel Podberesky, Douglas Sidell, Robert Thomen, Jason Woods, Robert Wood, and Sarah Haula

- Automated Segmentation and Derivation of Normal Values for Dynamic Modeling of the Trachea in Health and Disease.

**Critical Care Medicine; Radiology** » Samraj Ravi, Sharon Banschbach, Eric Crotty, Eileen Catherine Beckman, Lesley Doughty, and Derek Wheeler

- Procalcitonin Levels in Critically ill Children with Status Asthmaticus and Ractive Airway Disease.

**Cancer and Blood Diseases; Radiology** » Kalfa and Robert Fleck

- TwiTCH Treatment Study

**Cancer and Blood Diseases; Radiology** » Nicholas Cost, Ashley Walther, James Geller, and Eric Crotty

- Nephrometry for Renal Tumors

**Cancer and Blood Diseases; Radiology** » Karen Kalinyak and Robert Fleck

- Role of Placenta Growth Factor in Sickle Acute Chest Syndrome.

**Cancer and Blood Diseases; Radiology** » Charles Quinn and Robert Fleck

- Novel Cardiac Magnetic Resonance Imagine to Define a Unique Restrictive Cardiomyopathy in Sickle Cell Disease.

**Endocrinology; Radiology** » Gutmark Little and Robert Fleck

- Computational Modeling Airway and Blood Vessels in Carious Endocrine Disorders.

**Endocrinology; Radiology** » Gutmark Little and Robert Fleck

- Prediction of Sleep Disordered Breathing based on Airway Anatomy and flow in Turner Syndrome Patients.

**Pulmonary Medicine; Radiology** » John Clancy and Robert Fleck

- Pilot Study of Cardiac MRI to assess pulmonary perfusion and pulmonary hemodynamics in patients with cystic fibrosis.

**Pulmonary Medicine; Radiology** » Rami Amin and Robert Fleck

- Dynamic Computational Modeling of Obstructive Sleep Apnea in Down Syndrome.

**Cancer and Blood Disease; Radiology** » Jennifer Williams, Denise Adams, Arnold Merrow, and Anita Gupta
Cancer and Blood Disease; Radiology » Denise Dams, Arnold Merrow, Ravindra Ellurua, Alex Vinks, Renne Doughman, Donna Jackson, Christine Minges, Carol Chute, John Perentesis, Mary Sue Wnetzel, Lisa Campbell, Cara Wilbourn, Manish Patel, and Renne Doughman

SIR-DA-1202

Cancer and Blood Disease; Radiology » Hammill Adrienne, Anita Gupta, Erin Mundt, Arnold Merrow, Denise Adams, and Paula Mobberley Schuman

PTEN Mutations

Cancer and Blood Diseases; Radiology » James Gellar, Marueen O’Brien, Courtney Blank, Lori Miller, Kren Burns, Megan Westendorf, Lars Wagner, Laurie Jean Grime, Christine Phillips, Jeny Thomas-quinn, Stacey Crane, Donna Jackson, Alex Towbin, Mariko Dewire, Beth Ann Stockman, Adrienne Hammill, Mary Suhre, Norma Wollum, Carrye Cost, Johannes C.M. van der Loo, Jonathan Fisk, Kamlesh Kukreja, Maryam Fouladi, Lane Satterthwate, laure Mayer, Denise Adams, Cara Wilburn, Brian Weiss, Lori Backus, Julie McDonald, Siri Steiner, Lionel Chow, Benjamin Mizukawa, Renee Doughman, Michael Absalon, Neill Johnson, John Racadio, Erin McGuire, Trent Hummel, Manish Patel, Jennifer Mangino, Brian Turpin, Michelle Bierman, Rajaram Nagarajan, and Mariane Torontali


Technology Development; Imaging Research Center; Radiology » Charles Dumoulin, John Lanie, Yu Li, Diana Lindquist, Weihong Yuan, Scott Holland, Julie Franks-Henry, Kim Cecil, Janaka Wansapura, lacey Sickinger, Gregory Lee, Brynne Williams, Lisa Tully, Leonid Rozhkov, Rachel Wolf, Jean Tkach, Sara Simpson, John Racadio, Charles Dumoulin, Patrick Winter, Suraj Serai, Julie Young, Mark DiFrancesco, Michael Taylor, Sarah Finucane, Jason Woods, Jennifer Vannest, Kansie Somers, and

Technology Development on Clinical and Research MR Scanner.

Safe and Healthy Children; Radiology » Mary Greiner, James Leach, Marguite Care, and Broks Keeshin

Enlarge Subarachnoid Spaces

Neurology; Biostatistics and Epidemiology; PNRC; Biomedical Informatics; Radiology » Scott Holland, Gregory Lee, Jennifer Vannest, Mekibib Altaye, Anna Byars, Akila Rajagopal, Julie Franks-henry, Nautiah Robinson, Michael Wagner, Andrew Rupert, Nicholas Felicelli, Nicole Cicchino, Mark Schapiro, Kansie Somers, Sara Finucane, James Leach, and Mary Sroka

HHSN275200900018C, Pediatric Functional Neuroimaging Research Network

Psychiatry; PNRC » Scott Holland, Robert Kowatch, Jennifer Combs, K Robbins, Sarah Finucane, and Nicole Cicchino

Longitudinal Assessment of Manic Symptoms.

Biostatistics and Epidemiology; Neurology; PNRC » Scott Hollan, Mekibib Altaye, Anna Byars, and Mark Schapiro

fMRI Normal Language Development in Children.

Neurosurgery; PNRC; Biostatistics and epidemiology; » Weihong Yuan, Francesco Mangano, Scott Holland, Mekibib Altaye, Sarah Simpson, and Akila Rajagopal

Longitudinal DTI study in children treated for congenital hydrocephalus.

Rheumatology; PNRC » Mark DiFrancesco and Hermine Brunner
Improved Diagnostics & Advanced Magnetic Resonance Imaging for Pediatric NPSLE.

PEDiATRIC MEDiCINE AND REHABiLITATION; PNRC » WeiHong Yuan and Shari Wade
   Effects of Cognitive training on attention following pediatric TBI.

PULMONARY; PNRC » Mark DiFrancesco and Raouf Amin
   Disorder of Central Cardiovascular Control in Children with OSA.

BEHAViORAL MEDiCINE AND CLiNiCAL PSYChOLOGY; PNRC » Mark DiFrancesco and Dean Beebe
   Effect of Adolescent Sleep Restriction on Neural and Neurobehavioral Functioning.

Biostatistics & Epidemiology; Imaging Research Center » Janaka Wansapura and Rhonda Szczesniak
   Cardiac structure and function in early familial cardiomyopathy.

PEDIATRIC OTOLARYNGOLOGY; PULMONARY MEDiCINE; ANESThEsIA; Biostatistics & Epidemiology; Radiology;
   Imaging Research Center » Robert Fleck, Charles Dumoulin, Sally Shott, Raouf Amin, Katie VanDeGrift, Keith McConnell, Mohamed Mahmoud, Matthew Fenchel, Rhonda Szczesniak, and
   Dynamic Computational Modelin of Obstructive Sleep apnea in Down Syndrome (DYMOSA).

Speech-Language Pathology; Neurology; Imaging Research Center » Jean Tkach, Thomas Maloney, Erin Redle, Jennifer Vannest, and Kate Hibbard
   Functional MR Imaging Study of Speech Production in Childhood Apraxia of Speech.

Pulmonary Medicine; Radiology; Imaging Research Center » Alan Brody, Robert Fleck, and John Clancy
   MR predictors of infection, inflammation, and structural lung damage in CF.

Neurology; Imaging Research Center » Kim Cecil and Donald Gilbert
   2/2-anomalous Motor Physiology in ADHD.

Biostatistics and Epidemiology; Imaging Research Center » Kim Cecil and Patrick Ryan
   Neurobehavioral and neuroimaging effects of traffic exposure on children.

Nephrology; Image Research Center » Charles Dumoulin, John Bissler, and Yu Li
   TS Alliance Courage Award

Neonatology and Pulmonary Biology; Image Research Center » Jean Tkach and Andrew South
   Intestinal Motility and Gastroschisis.

Grants, Contracts, and Industry Agreements

Grant and Contract Awards

<table>
<thead>
<tr>
<th>Grant and Contract Awards</th>
<th>Annual Direct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Computational Modeling of Obstructive Sleep Apnea in Down Syndrome</td>
<td>$750,679</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td></td>
</tr>
<tr>
<td>R01 HL 105206</td>
<td>09/17/10-08/31/14</td>
</tr>
<tr>
<td>BALL, W</td>
<td></td>
</tr>
<tr>
<td>Silent Cerebral Infarct Multi-Center Clinical Trial</td>
<td>$6,739</td>
</tr>
<tr>
<td>National Institutes of Health(Washington University)</td>
<td></td>
</tr>
<tr>
<td>U01 NS 042804</td>
<td>09/30/03-06/30/13</td>
</tr>
<tr>
<td>BRODY, A</td>
<td></td>
</tr>
</tbody>
</table>
Therapeutic Development Center - TDN Imaging Center
Cystic Fibrosis Foundation Therapeutics, Inc.

11/3/03-12/31/13 $17,723

DUMOULIN, C

**Endorectal Prostate MRI w/Tetrahedron Tracking: Better Cancer Delineation**
National Institutes of Health (Brigham & Women's Hospital)
R21 CA 158987 07/01/12-06/30/14 $35,000

**MR-Image Guided Focused Ultrasound for Treatment of Liver and Renal Cancer**
National Institutes of Health (Stanford University)
R01 CA 121163 04/01/06-05/31/14 $49,020

**Ohio Third Frontier Medical Imaging Program**
Ohio Department of Development (GE Healthcare)
ODODTECH11-49 07/15/12-07/14/14 $144,712

HOLLAND, S

**Pediatric Functional Neuroimaging Research Network**
National Institutes of Health
HHSN275200900018C 09/28/09-09/27/14 $1,271,869

**Reading Fluency Training in Grade 4 and Reading and Writing Fluency Training in Grade 5**
US-Israel Binational Science Foundation
2009053 09/01/11-08/31/13 $15,000

**The Ability of Executive Functions and Reading to Improve Following Reading Intervention among Children with Reading Disability: An fMRI Study**
University of Cincinnati
07/01/12-06/30/13 $25,000

KIM, H

**MR Quantification of Muscular Fat in Duchenne Muscular Dystrophy: Integrating T2 Relaxation Time Mapping and MR Spectroscopy**
RSNA Research & Education Foundation
RSCH1204 07/01/12-06/30/14 $76,000

LEACH, J

**Diagnostic Imaging Review: NIH COG Chair Grant**
National Institutes of Health (Children's Hospital of Philadelphia)
U10 CA 098543 03/01/13-02/28/14 $1,848

LI, Y

**MR-guided HIFU for Cancer Therapy**
St. Baldrick's Foundation
Baldrick 2012 07/01/12-06/30/13 $100,000
Non-Invasive MR-Guided HIFU Therapy of TSC-Associated Renal Angiomyolipomas
Department of Defense
W81XWH1110299 07/01/11-06/30/13 $50,467

LINDQUIST, D

Epigenetics of Lead Toxicity in Mouse Brain
National Institutes of Health (University of Cincinnati)
R21 ES 020048 06/09/11-05/31/13 $29,304

White Matter Protection in Acute Ischemic Stroke
National Institutes of Health (Emory University)
R21 NS 074559 09/10/12-06/30/13 $21,287

TOWBIN, A

Diagnostic Imaging Review: NIH COG Chair Grant
National Institutes of Health (Children's Hospital of Philadelphia)
U10 CA 098543 03/01/13-02/28/14 $1,725

WANSAPURA, J

Cardiac Structure and Function in Early Familial Cardiomyopathy
National Institutes of Health
K25 HL 102244 04/15/10-03/31/15 $135,039

YUAN, W / MANGANO, F (MPI)

Longitudinal DTI Study in Children Treated for Congenital Hydrocephalus
National Institutes of Health
R01 NS 066932 09/30/09-06/30/13 $369,849

Current Year Direct $3,101,261

Industry Contracts

BRODY, A

PTC Therapeutics, Inc. $31,244

FLECK, R

Bayer HealthCare Pharmaceuticals, Inc. $12,320

Current Year Direct Receipts $43,564

Funded Collaborative Efforts

BRODY, A

MR predictors of infection, inflammation, and structural lung damage in CF
<table>
<thead>
<tr>
<th>Institution</th>
<th>Name</th>
<th>Start Date</th>
<th>End Date</th>
<th>Funding Percent</th>
<th>Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Institutes of Health</td>
<td>Clancy, J</td>
<td>9/26/12-6/30/13</td>
<td></td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>CECIL, K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2/2-Anomalous Motor Physiology in ADHD</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Gilbert, D</td>
<td>5/15/2012-4/30/2014</td>
<td></td>
<td>16%</td>
<td>Neurobehavioral and Neuroimaging Effects of Traffic Exposure on Children</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Ryan, P</td>
<td>7/1/2012-3/31/2014</td>
<td></td>
<td>20%</td>
<td>Early Lead Exposure, ADHD &amp; Persistent Criminality: Role of Genes and Environment</td>
</tr>
<tr>
<td>University of Cincinnati</td>
<td>Dietrich, K</td>
<td>6/1/2007-3/31/2013</td>
<td></td>
<td>26%</td>
<td>Epigenetics of Lead Toxicity in Mouse Brain</td>
</tr>
<tr>
<td>University of Cincinnati</td>
<td>Lindquist, D</td>
<td>06/09/11-05/31/13</td>
<td></td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>DIFRANCESCO, M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cincinnati Multidisciplinary Clinical Research Center</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Lovell, D</td>
<td>09/01/01-07/31/13</td>
<td></td>
<td>20%</td>
<td>Effects of Adolescent Sleep Restriction on Neural and Neurobehavioral Functioning</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Beebe, D</td>
<td>09/01/09-07/31/13</td>
<td></td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>DUMOULIN, C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cincinnati Center for Clinical &amp; Translational Sciences &amp; Training</td>
</tr>
<tr>
<td>University of Cincinnati</td>
<td>Heubi, J</td>
<td>04/03/09-03/31/14</td>
<td></td>
<td>8%</td>
<td>Dynamic Computational Modeling of Obstructive Sleep Apnea in Down Syndrome</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Amin, R / Fleck, R / Gutmark, E / Shott, S</td>
<td>09/17/10-08/31/14</td>
<td></td>
<td>3%</td>
<td>Non-Invasive MR-Guided HiFU Therapy of TSC-Associated Renal Angiomyolipomas</td>
</tr>
<tr>
<td>Department of Defense</td>
<td>Li, Y</td>
<td>07/01/11-06/30/14</td>
<td></td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Tuberous Sclerosis Alliance</td>
<td>Bissler, J</td>
<td>03/15/11-06/30/13</td>
<td></td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>FLECK, R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MR predictors of infection, inflammation, and structural lung damage in CF</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Clancy, J</td>
<td>9/26/12-6/30/13</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>-----------------</td>
<td>-----</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HOLLAND, S

**Imaging the effect of centrotemporal spikes and seizures on language in children**
National Institutes of Health
Vannest, J 09/15/11-06/30/16 2%

**Longitudinal Assessment of Manic Symptoms (LAMS)**
National Institutes of Health
Kowatch, R 09/16/05-02/28/15 27%

**Effects of Adolescent Sleep Restriction on Neural and Neurobehavioral Functioning**
National Institutes of Health
Beebe, D 09/01/09-07/31/13 2%

**Longitudinal DTI study in Children Treated for Congenital Hydrocephalus**
National Institutes of Health
Yuan, W 09/30/09-06/30/13 5%

LEACH, J

**Pediatric Functional Neuroimaging Research Network**
National Institutes of Health
Holland, S 09/28/09-09/27/14 10%

LEE, G

**Pediatric Functional Neuroimaging Research Network**
National Institutes of Health
Holland, S 09/28/09-09/27/14 31%

LI, Y

**TS Alliance Courage Award**
Tuberous Sclerosis Alliance
Bissler, J 03/15/11-06/30/13 4%

TKACH, J

**Intestinal Motility and Gastroschisis**
The Gerber Foundation
South, A 07/01/13-06/30/16 10%

WINTER, P

**MR-Image Guided Focused Ultrasound for Treatment of Liver and Renal Cancer**
National Institutes of Health
Butts Pauly, K 04/01/06-05/31/14 6%
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Principal Investigator</th>
<th>Start Date</th>
<th>End Date</th>
<th>Budget Percentage</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects of Cognitive training on attention following pediatric TBI</td>
<td>Wade, S</td>
<td>07/01/11-06/30/13</td>
<td></td>
<td>5%</td>
<td>$3,144,825</td>
</tr>
</tbody>
</table>

Total $3,144,825