

Pediatric Cardiology Fellowship Training program

Program Brochure for Prospective Fellows



Pediatric Cardiology Faculty

J. Philip Saul, MD, Director

Robert H. Anderson, MRCP

Andrew Atz, MD

Rani Bandisode, MD

Geoffrey Forbus, MD

Eric Graham, MD

Dieter Haemmerich, PhD

Melissa Henshaw, MD

Anthony Hlavacek, MD

Kyu-Ho Lee, MD, PhD

Tim McQuinn, MD

Rupak Mukherjee, PhD

John Reed, MD

Jeremy Ringewald, MD

Girish Shirali, MD

Frances Woodard, RN, MSN, CPNP

Pediatric Cardiology Fellows

Brad Friedman, MD

Michael Walsh, MD

Amy Jones, MD

Andrew Savage, MD

Kelly Gajewski, MD

Javier Gonzalez, MD

Sinai Zyblewski, MD

G. Hamilton Baker, MD

Thomas Pilcher, MD

Surgeons

Scott M. Bradley, MD

Fred A. Crawford, Jr, MD

Tain-Yen (T-Y) Hsia, MD

Pediatric Cardiology Fellowship Training Program

Director: Girish S. Shirali, MD

Assistant Director: Eric Graham, MD

Coordinator: Debbie Bryant

Assistant Coordinator: Barbara Roberts

Recent Graduates

2007: Alexander Ellis, MD.

Dr. Ellis is currently Assistant Professor, Division of Cardiology, Dept of Pediatrics, Eastern Virginia Medical School, Norfolk, VA. His career focus is on adults with congenital heart disease.

2006: Anthony Hlavacek, MD.

Dr. Hlavacek is currently Instructor, Division of Cardiology, Dept of Pediatrics, Medical University of South Carolina, Charleston, SC. He completed the Master's of Science in Clinical Research in 2007. His career interests are in cardiac imaging (2D and 3D echocardiography, CT angiography, MRI) and cardiac epidemiology. He is funded by an institutional K12 Career Development Award for work on ventricular function in infants with chorioamnionitis.

2005: Eric Graham, MD.

Dr. Graham is currently Assistant Professor, Division of Cardiology, Dept of Pediatrics, Medical University of South Carolina, Charleston, SC. His career interests are in pediatric cardiac intensive care. Dr. Graham is Assistant Director of the Pediatric Cardiology Fellowship Training program. Dr. Graham is funded by the American College of Cardiology Foundation Pfizer Career Development Award.

2005: Mark Scheurer, MD.

After completing 3 years of training at MUSC, Dr. Scheurer moved to The Children's Hospital, Boston, MA for advanced training in Pediatric Cardiac Intensive Care. He has stayed on as a faculty member in Boston. Dr. Scheurer is currently Instructor in Pediatrics, Department of Cardiology, The Children's Hospital, Boston, MA. His career interest is in pediatric cardiac intensive care.

2005: Scott Maurer, MD.

Dr. Maurer is practicing pediatric cardiology at the Department of Pediatrics, Naval Medical Center, San Diego, California.

2005: David Fairbrother, MD.

Dr. Fairbrother is Assistant Professor, Department of Pediatrics at East Virginia University, Greenville, NC. During his four-year fellowship, he developed expertise in electrophysiology and also completed the Master's of Science in Clinical Research. His career interest is in pediatric electrophysiology and device therapies.

2004: Geoffrey Forbus, MD.

Dr. Forbus is Assistant Professor, Division of Cardiology, Dept of Pediatrics, Medical University of South Carolina, Charleston, SC. His career interests are in pediatric cardiac intensive care and echocardiography. Dr. Forbus is the Director of Outpatient Services and Assistant Director, Echocardiography.

2004: Jon Lucas, MD.

Dr. Lucas is Assistant Professor, Pediatric Cardiology at the University of South Carolina School of Medicine, Greenville Hospital Systems in Greenville, SC. His interests are in clinical pediatric cardiology and noninvasive imaging.

Advanced Fellows

2007: Alexia Santos, MD.

Dr. Santos came to MUSC for a fourth year of training in Echocardiography after completing 3 years of Pediatric Cardiology fellowship training at Columbus Children's Hospital, Columbus, Ohio. Dr. Santos is currently Instructor, Division of Pediatric Cardiology, Texas Children's Hospital and Baylor College of Medicine.

2006: John Reed, MD.

Dr. Reed came to MUSC for a fourth year of training in Electrophysiology after completing 3 years of Pediatric Cardiology fellowship training at the University of Colorado, Denver, Colorado. Dr. Reed is Assistant Professor, Division of Cardiology, Dept of Pediatrics, Medical University of South Carolina, Charleston, SC. His career interests center on pediatric electrophysiology, ablation techniques and device therapies.

OVERALL EDUCATIONAL GOALS

The goal of the Pediatric Cardiology Fellowship Training Program at the Medical University of South Carolina is to train excellent clinical pediatric cardiologists who are productive researchers in clinical or basic science. Implicit in the educational goals of the program is the successful acquisition and continued implementation of the six core competencies so as to instill the concepts of life-long learning, reflection and self-assessment. Trainees with these skills are essential to the future of academic pediatric cardiology. In order to achieve these goals, trainees dedicate the initial portion of their training, approximately 18 months, to building their skills in general clinical pediatric cardiology. Subsequent specialized clinical and/or basic research and clinical training is determined by the trainee's individual goals. Many trainees will require a fourth year of training to meet their goals, and several mechanisms are available to support advanced training. At the conclusion of the pediatric cardiology fellowship, trainees will have acquired and successfully demonstrated the knowledge, skills and attitudes to become valued and productive members of the academic pediatric cardiology community.

The combined faculty opinion, based on past trainees as well as personal experiences of our own training, supports the concept that there is a formative clinical period for pediatric cardiology fellows that is not the same as the 12-month academic year schedule. We feel that in practice that there are three levels of achievement that are accomplished at different points for different individuals.

I. **Beginning Fellow**

We do not expect technical or intellectual knowledge of pediatric cardiology at the start of pediatric cardiology subspecialty residency training. We do require that trainees be experienced physicians and have excellent general pediatric clinical skills. A trainee who is well-suited for our program should therefore be comfortable and reliable in the following:

- performance and documentation of general history and physical examination skills
- progress note documentation
- phlebotomy, peripheral intravenous access
- sterile technique
- endotracheal intubation
- chest x-ray interpretation
- laboratory test interpretation
- invasive arterial blood pressure monitoring
- general indications for and principles of mechanical ventilation
- general pediatric pharmaceutical principles and strategies
- indications for and administration of blood and blood products.

II. **Intermediate Fellow**

The full transition from beginning to intermediate level of pediatric cardiology skills generally requires 12 to 18 months (depending on the trainee) of consistent clinical exposure to the broad range of pediatric cardiology clinical activities. An intermediate level trainee has achieved independence in most of the clinical skills routinely associated with the general practice of pediatric cardiology. Independence for trainees is very real for some procedures, such as performing an echocardiogram, while in others it is hypothetical, as in the catheterization laboratory, where supervision is present 100% of the time.

III. Advanced Fellow

The advanced pediatric cardiology fellow has achieved the intermediate level skills defined above, and has built upon those skills to acquire depth in a specific subset of skills in clinical or basic research, and clinical practice. The specific goals are defined by the individual pediatric cardiology fellow and are intended to enhance and define the future career opportunities of the pediatric cardiology fellow. The advanced trainee has also developed depth in the general skills required for continued participation in the on call schedule at our institution and in their future career. We expect that by the completion of their training each pediatric cardiology fellow will meet the minimum criteria established in July 2000 by the Program Requirements for Residency Education in Pediatric Cardiology – 300 echocardiograms, 100 catheterizations, and 10 pediatric electrophysiology studies.

PROGRAM DESCRIPTION

Year 1

The fellow learns the core clinical skills of a pediatric cardiologist, with close supervision by Faculty.

- **Introduction, 1 month**

The first month is split into 3 introductory 10-day blocks that expose the fellow to Inpatient Cardiology, Intensive Care Cardiology and Echocardiography. The rest of the year is spent learning skills in all clinical areas.

- **Cardiac Intensive Care Unit (PCICU), 2 months**

The fellow is responsible for medical, preoperative and postoperative patients in the new, 12 bed, dedicated Pediatric Cardiac Intensive Care Unit. This rotation provides an excellent opportunity to be exposed to the nuances of perioperative management and the team approach: the fellow is supervised by dedicated Pediatric Cardiology ICU Faculty as well as by the Pediatric Cardiac Surgeon.

- **Cardiology Ward and Consults (7C), 2 months**

The fellow is responsible for general (floor) inpatients with cardiac problems. He/she reports to the Attending Pediatric Cardiologist on service and conducts daily rounds with the latter, together with the Pediatric Cardiology Nurse Practitioner. The fellow supervises and teaches pediatric residents and medical students.

- **Echocardiography, 3 months**

The fellow performs and interprets trans-thoracic echocardiograms; on this rotation, pediatric sonographers and faculty work together to train fellows in scanning and interpretation.

- **Cardiac Catheterization, 2 months**

The fellow evaluates patients who are admitted for hemodynamic and interventional investigation, and interprets echocardiographic data on them prior to the catheterization. The fellow performs the catheterization and analyzes and reports the hemodynamic data afterwards.

- **Electrophysiology, 1 month**

The fellow develops skills in reading EKG's and Holters, and assists in the performance of diagnostic and therapeutic intracardiac electrophysiologic procedures.

- **Research, 1 month**

We have recently instituted a one-month research rotation in the spring of the first year. Goals during this rotation are as follows:

- Reflect on their clinical experiences
- Complete required online research training
- Explore career goals and direction with the help of their mentor
- Meet with the Scholarship Oversight Committee.

Year 2

During the 2nd year, fellows have a flexible schedule, with 4-5 months of protected research time; the latter is spent developing and implementing clinical or basic research projects under the supervision of a faculty mentor. The structure of the remaining months is based on a combination of the individual fellow's subspecialty interests and the clinical needs of the program. Clinical rotations provide increasing autonomy as the fellow matures in skills and approach.

Years 3 and 4

During the 3rd and 4th years, fellows have a flexible schedule depending on their career goals.

- For those who plan a 3-year training program, the goals are to complete their research project and well-rounded clinical training. Their interests are best served by approximately equal exposure to clinical and protected research rotations.
- For those who plan a 4-year training program, enrollment in the [Master's of Science in Clinical Research](#) program at MUSC is available in the fall of year three. This 2-year program is designed specifically to train individuals for leadership roles in academic medicine and clinical research, with the goal of success in obtaining extramural grant funding. This program requires class work 2 afternoons a week for 2 years, and consists of a 38 academic credit hour curriculum that includes classroom lectures and seminars. This is a non-thesis program; students demonstrate their proficiency in clinical research by developing a grant suitable for submission to a funding agency. This graduation exercise is expected to occur in the summer of year four. Our program's institutional training (T32) grant pays the tuition for this program. Our Division is committed to the success of fellows who enroll in this program, but it requires hard work and commitment to be able to balance the demands of the MSCR with the clinical demands of the fellowship training program. Fellows who are enrolled in the MSCR spend 3 months in each of their 3rd and 4th years on clinical rotations that are related to their field of interest.
- Funding is available for a 4-year training program *without* enrolment in the MSCR program. The schedules for the 3rd and 4th years for such a program are customized.

Outpatient Experience

The outpatient experience for fellows consists of one day a week for the entire duration of the fellowship. This rotation is scheduled on a fixed day of the week, with a designated Faculty member. This provides fellows with the continuity of care that is a desirable part of the outpatient experience.

On Call Experience

Night and weekend call are taken every fourth to sixth night or weekend during the first year, decreasing in frequency over the subsequent three years. All call is in-house. There is no call-free rotation.

Schedule of Conferences

Conference	Frequency	Required/Optional	Role of the Fellow
Pre-operative Conference	Weekly (52 / year)	R	Presenter, discussant
Medical Conference	Bi-weekly (26 / year)	R	Presenter, discussant
Clinical / Translational Research Conference	Semi-monthly (24 / year)	R	Present detailed progress reports of his / her own research studies
Clinical Research Meeting	Bi-monthly (6 / year)	R	Present summary of research progress over prior 2 months and plans for subsequent 2 months
Journal Club	Bi-monthly (6 / year)	R	Presenter, discussant
Cath Lab and Inpatient Mortality and Morbidity Conference	Bi-monthly (6 / year)	R	Presenter, discussant
Echocardiography Quality Assurance	Bi-monthly (6 / year)	R	Conducts conference: Presenter, discussant
Pediatric Cardiology Core Curriculum	Weekly (52 / year)	R	All fellows participate in Q&A component in this didactic series that is presented primarily by Pediatric Cardiology faculty. Senior fellows deliver 1-2 lectures per year.
Pediatric Cardiac Pathology Conference	30 / year	R	Hands-on learning with heart specimens, discussion with other fellows and faculty
Echocardiography Case Conferences	Weekly (52 / year)	R	Participate in discussion
Pediatric Grand Rounds	Weekly except July, August (44 / year)	O	Observer (Participation limited to Q&A component)
Departmental Fellows' Core Curriculum	Monthly plus online materials	R	Observer, discussant
Research Coordinator Development Program	13 per course, offered several times per year	O	Participant, discussant
Clinical Research Methods	26 online hours	R	Participant, student
Grantsmanship	2 hours / per	O	Participant, discussant

Workshop	course, offered several times a year		
Apple Tree Society lectures	6 / year plus online materials	O	Observer (Participation limited to Q&A component)
GME Lecture Series	10 / year	R	Observer (Participation limited to Q&A component)

Published Papers, Abstract Presentations, Books and Chapters, Invited Talks

2002-2007

(Fellow names are underlined)

Articles:

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11. Baker G, Flack E, Hlavacek A, Chessa K, Fleming D, Scheurer M, Shirali G. Variability and Resource Utilization of Bedside Three-dimensional Echocardiographic Quantitative Measurements of Left Ventricular Volume in Congenital Heart Disease. *Congenital Heart Disease* 2006; 1(6):309-14
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13. Baker GH, Pereira NL, Hlavacek AM, Chessa K, Shirali GS. Transthoracic Real-Time Three-Dimensional Echocardiography in the Diagnosis and Description of Noncompaction of Left Ventricular Myocardium. *Echocardiography* 2006;23(6):1-5.
14. Baker GH, Shirali GS, Bandisode VM. Transseptal Left Heart Catheterization in a Patient with a Prosthetic Mitral Valve : Live Three-Dimensional Transesophageal Echocardiography. *Pediatr Cardiol* 2007 (in press).

15. Balaguru D, Anderson RH, Rosenthal GR, Cook A, Radtke WAK, Shirali GS. Predictors of residual defects following closure of atrial septal defects using the Amplatzer device: echocardiography recapitulates morphometry. *Cardiol Young* 2003;13:352-60.
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Abstract Presentations:

1. Amin Z, Forbes T, Zahn E, Moore P, Hijazi Z, Cheatham J, Hagler D, Ebeid M, Sievert H, Qureshi S, Fagan T, Ringewald J, Hellenbrand W. Acute Complications Associated with Stent Placement in Native

- and Postoperative Coarctation of Aorta: A Multi-institutional Study. Presented at the American Heart Association Annual Scientific Session, New Orleans, LA, October 2004.
2. Amin Z, Ringewald J, Fagan T, Hijazi Z, Moore P, Turner D, Forbes T. Preliminary Results of Genesis Stents in Native and Postoperative Pediatric Congenital Cardiac Lesions: a Multi-Institutional Study. Society for Cardiac Angiography and Interventions, May 2003.
 3. Anderson PA, Atz AM, Breitbart RE, Clark BJ, Hsu DT, McCrindle BW, Williams RV, Sleeper LA, Mitchell P. The Fontan Patient: Present Medical Therapy at Seven Pediatric Cardiology Centers. AHA Meeting, Dallas TX, 11/05.
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 6. Atz AM, Anderson PAW, Breitbart RE, Colan SD, Mitchell PD, Hsu DT, Lu M, Mahony L, Paridon SM, Williams RV, McCrindle BW. Factors Associated with Serum Brain Natriuretic Peptide Levels in Patients after the Fontan Procedure. ACC, New Orleans LA, 3/07.
 7. Atz AM, Jenkins PC, Brook M, Canter CE, Jenkins KJ, Mahle WT, Sharkey AM, Vincent RN, Flanagan MF. Growth Failure in Patients With Hypoplastic Left Heart Syndrome Undergoing Staged Reconstruction. AHA Meeting, New Orleans LA, November 2004.
 8. Baker GH, Ringewald JM, Bandisode VM. Immediate Branch Pulmonary Artery Distention Following Balloon Valvuloplasty for Critical and Severe Pulmonary Stenosis in Neonates. Society for Cardiac Angiography and Interventions, May 2006.
 9. Baker G, Flack E, Hlavacek A, Chessa K, Fleming D, Scheurer M, Shirali G. Variability and Resource Utilization of Bedside Three-dimensional Echocardiographic Quantitative Measurements of Left Ventricular Volume in Congenital Heart Disease. AAP Meeting, Atlanta GA, 10/06.
 10. Baker GH, Hlavacek AM, Chessa K, Fleming D, Shirali G. Left Ventricular Dysfunction is Associated with Intra-ventricular dyssynchrony in children. Southeastern Pediatric Society Annual Meeting, Atlanta; September 2006.
 11. Baker GH, Hlavacek AM, Chessa K, Fleming D, Shirali G. Left Ventricular Dysfunction is Associated with Intra-ventricular dyssynchrony in children. American College of Cardiology, New Orleans, LA; March 2007.
 12. Baker GH, Hlavacek AM, Chessa K, Fleming D, Ruff P, Shirali G. Three-Dimensional Measurements of Left Ventricular Dyssynchrony in Children. Oral presentation at the Southeastern Pediatric Cardiology Society Annual Meeting. Stone Mountain, GA 09/06
 13. Baker GH, Hlavacek AM, Chessa K, Fleming D, Shirali G. Left Ventricular Dysfunction is Associated with Intra-ventricular Dyssynchrony and Dispersion of Regional Excursion in Children. Oral Abstract, American Society of Echocardiography, Seattle WA 6/07.
 14. Baker GH, Hlavacek AM, Ringewald JM, Bandisode V. Sedation and the Predictive Power of Mean Doppler Gradient for Balloon Aortic Valvuloplasty in Congenital Aortic Stenosis. Poster presentation, Pediatric Interventional Cardiac Symp. Las Vegas, NV 7/07
 15. Baker GH, Pereira N, Hlavacek AM, Chessa K, Shirali G. Early experience in the use of three-dimensional echocardiography in clinical characterization of left ventricular noncompaction. Southeastern Pediatric Cardiology Society, Mission Inn Resort FL, 9/04.
 16. Baker GH, Ringewald J. Proximal Branch Pulmonary Artery Diameter after Balloon Valvuloplasty for Critical Pulmonary Stenosis of the Newborn. Society of Cardiovascular Angiography and Interventions, Chicago IL, 2006
 17. Baker GH, Ringewald JM, Shirali G, Bandisode V. Real-Time Three-Dimensional Transesophageal Echocardiographic Guidance of Complex Post-Myocardial Infarction Ventricular Septal Defects. Poster, Pediatric Interventional Cardiac Symp. Las Vegas NV 7/07
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142. Saul JP, Mukherjee R, Bruce JA, McClister DM Jr, Allen CM, Austin JS, Fini ME. Spatial and temporal regulation of matrix metalloproteinase-9 transcriptional activation following discrete myocardial injury. American College of Cardiology; Orlando, FL, March 2005.
143. Scheurer M, Bandisode VM, Ruff P, Atz AM, Shirali GS. Early experience with real-time 3D echocardiography-guided right ventricular endomyocardial biopsy in children. Presented, Cardiology 2004: the 7th Annual Postgraduate Course in Neonatal and Pediatric Cardiovascular Disease, Orlando FL, February 2004.

144. Scheurer M, Bandisode VB, Ruff PJ, Atz AM, Shirali GS. Early experience with three-dimensional echocardiography in right ventricular biopsy in children. Poster presentation at CHOP Seventh Annual Update on Pediatric Cardiovascular Disease, Orlando FL, 2004.
145. Scheurer M, Bandisode VB, Atz AM. Simplified Pulmonary Vasodilatory Testing in the Cardiac Catheterization Laboratory with Nasal Cannula Nitric Oxide. Oral presentation at AHA, Orlando, FL, 2003.
146. Scheurer M, Simsic JM, Tobias JD, Berkenbosch J, Schechter WS, Madera F, Weinstein S, Michler RE. Perioperative hemodynamic effects of nesiritide following cardiac surgery in children. Presented at SPCS, Mission Inn Resort FL, Sept.8-11, 2004.
147. Scheurer MA, Vasuki N, Maurer S, Graham EM, Bandisode V, Shirali GS, Atz AM, Bradley SM, Survival after Bidirectional Cavopulmonary Anastomosis: A Risk Factor Analysis. AHA Meeting, Dallas TX, November 2005.
148. Scheurer MA, Bradley SM, Shirali GS, Atz AM. Atrioventricular Regurgitation at Cavopulmonary Anastomosis is Associated with Failure to Successfully Complete the Fontan. 8th Annual Update on Pediatric Cardiovascular Disease, Orlando, FL, February 2005.
149. Schramm W, Haemmerich D. Comparison of Radiofrequency and Microwave ablation: Insights from computer modeling. World Conference on Interventional Oncology / Society of Thermal Medicine joint meeting, Washington D.C., May 2007.
150. Schramm W, Yang D, Haemmerich D. Contribution of direct heating, thermal conduction, and perfusion during radiofrequency and microwave ablation. IEEE EMBC 2006, New York, Sept 2006.
151. Schramm W, Yang D, Haemmerich D. Relative Contribution of Thermal Conduction and Direct Heating During Tumor Ablation. Society of Thermal Therapy Annual Meeting, Bethesda (MD), April 2006.
152. Schramm W, Yang D, Haemmerich D. Relative contribution of thermal conduction and direct heating during radiofrequency and microwave ablation. World Conference on Interventional Oncology, Como (Italy), June 2006.
153. Schutt DJ, Haemmerich D. Double-layered grounding pad design reduces skin heating during radiofrequency ablation. World Conference on Interventional Oncology, Como (Italy), June 2006.
154. Schutt DJ, Laeseke PF, Lee FT, Haemmerich D. Sequential activation of multiple grounding pads reduces skin heating. World Conference on Interventional Oncology, Como (Italy), June 2006.
155. Schutt DJ, O'Rourke AP, Will JA, Webster JG, Mahvi DM, Haemmerich D. Electrode array to minimize blood loss during liver resection: in-vivo results in a porcine model. World Conf on Interventional Oncol/Soc of Thermal Med joint meeting, Washington DC, 5/07.
156. Schutt DJ, Will JA, O'Rourke A, Webster JG, Mahvi DM, Haemmerich D. Electrochemical potential predicts ablation zone formation during radiorequency ablation. World Conference on Interventional Oncology, Como (Italy), June 2006.
157. Sedmera D., T. McQuinn. Echocardiography of the chick embryo. Presented at Weinstein Cardiovascular Development Conference, Tampa, FL 2006.
158. Simsic JM, Atz AM, Stroud MR, Bradley SM. Risk factors for interstage death after Norwood procedure. Presented at SCPCS, Braselton, GA, September 2002
159. Simsic JM, Bradley SM, Stroud MR, Atz AM. Cerebral oximetry as noninvasive indicator of mixed venous oxygen saturation in newborns after cardiac surgery. Presented at ACC, Chicago IL, April 2003.
160. Simsic JM, Mulvihill DM, Bradley SM. Hemodynamic Effects of Sodium Nitroprusside After Superior Cavopulmonary Connection. American College of Cardiology Meeting, 2002.
161. Skinner ML, Halstead LA, Rubinstein CS, Atz AM, Bradley SM. Laryngeal dysfunction following the Norwood procedure. AATS San Francisco, 4/11/2005.
162. Snarr, B, Wirrig E, Moralez I, Phelps J, Sedmera D, deAlmeida A, Hoffman S, McQuinn T, Jin TP, Somi S, van den Hoff M, Wessels A. H1-Calponin Identifies Muscularizing Cells in Embryonic Mouse and Chick Hearts. Weinstein Cardiovascular Development Conference, Tucson, Az, May 2005.
163. Taylor AL, Reed JH, Wolfe RR, Yetman AT. The Utility of Cardiopulmonary Stress Testing in Patients with a History of Coarctation of the Aorta. Abstract and poster presentation at The 23rd Pediatric Work Physiology Meeting, Gwatt-Thun, Switzerland, Sep.2005.

164. Turner D, Amin Z, Hellenbrand W, Forbes T, Ringewald J, Fagan T. Use of the Genesis-XD Stent to Treat Pulmonary Artery Stenosis and Obstruction to Right Ventricular Outflow in Infants. Society for Cardiac Angiography and Interventions, May 2003.
165. Unal SH, Suresh GK, Ebeling M, Atz AM, When is Treatment of a Patent Ductus Arteriosus (patent ductus arteriosus) with Indomethacin Futile? Presented at SPR, May 2006.
166. Van Hare GF, Carmelli D, Saul JP, Tanel RE, Fischbach PS, Kanter RJ, Schaffer MS. Prospective assessment after pediatric cardiac ablation: Initial results of the Multicenter Study. Meeting of American College of Cardiology, Chicago IL, 3/03.
167. Visconti RP, Ebihara Y, LaRue AC, Fleming PA, McQuinn TC, Masuya M, Minamiguchi H, Ogawa M, Drake CJ. A Hematopoietic Stem Cell Origin of Adult Cardiac Valve Fibroblasts. Weinstein Cardiovascular Development Conference, Tucson, Az, May 2005.
168. Welzig CM, Shin DG, Park HJ, Kim YJ, Saul JP. Lipid lowering by pravastatin increases parasympathetic modulation of heart rate. Meeting of the AHA, Nov.2003, Orlando, FL.
169. Wessel DL, Thiagarajan RR, Thomas K, Mullen MP, Gauvureau K, Adatia I, Atz AM, Roth SJ & Laussen PC. Inhaled nitric oxide use and response in congenital heart disease. Am. Thoracic Society, May 2002
170. Wessels A, Juraszek AL, Edwards AV, Burch JBE. (2002) Development of the Cardiac Conduction System in the Mouse. Etiology and Morphogenesis of Congenital cardiovascular Disease in the Post-genomic Era (New Takao Symp), Tokyo, Japan.
171. Wood BJ, Viswanathan A, Dromi S, Locklin J, Neeman Z, Uecker D, Klahr P, Bauer C, Kruecker J, Lala A, Haemmerich D, Cebal J, Sofer A, Yanof J. Integration of Pre-Procedural Treatment Planning and Intra-Procedural Temperature Visualization for CT-guided, Robot-assisted RF Ablation (RFA) of Liver Tumors. RSNA 2004, Chicago.
172. Wood BJ, Viswanathan A, McCreedy E, Dromi S, Locklin J, Neeman Z, Uecker D, Klahr P, Bauer C, Kruecker J, Lala A, Haemmerich D, Cebal J, Sofer A, Yanof J. Semi-Automated Treatment Planning Software for RF Ablation. Society of Interventional Radiology (SIR) Annual Meeting, New Orleans, April 2005.
173. Wood BJ, Bauer C, Viswanathan A, Kruecker J, McAuliffe M, Haemmerich D, Locklin J, Renisch S, Lala A, Yanof J. CT-Integrated treatment planning for thermal ablation with intraprocedural adaptive modifications. Society of Interventional Radiology (SIR) Annual Mtg, Toronto(Canada), April 2006.
174. Wright AS, Haemmerich D, Mahvi DM, et al. Hepatic microwave ablation: Radiologic-pathologic correlation and comparison with radiofrequency ablation. RSNA 2002, Chicago IL, Dec. 2002.
175. Wright, AS, Haemmerich, D, Chachati L, Mahvi DM, Lee Jr FT. Hepatic Radiofrequency Ablation with Multiple Active Electrodes is Superior to Conventional Overlapping Technique in an Ex Vivo Model. RSNA 2002, Chicago, December 2002.
176. Yanof J, Haemmerich D, Viswanathan A, McAuliffe M, Locklin J, Wood B. Patient-specific treatment planning for liver RFA using thermal modeling and integrated image-guided navigation tools. RSNA 2005, Chicago (IL), December 2005.
177. Yanof JH, Bauer C, Kruecker J, Xu S, Lala A, Glossop N, Haemmerich D, Wood BJ, Integration of Emerging Technologies for Patient-specific Treatment Planning and Intra-procedural Targeting, Monitoring, and controlling Multimodality Image-guided Percutaneous RFA. RSNA2006, Chicago, Dec 2006.
178. Yu Q, Leatherbury L, Wessels A, Lucas J, Svenson K, Lo C. High throughput noninvasive fetal screen for congenital heart defects in ENU mutagenized mice using Doppler echocardiography. 2003 Weinstein Cardiovascular Development Conf, Cambridge MA, 5/03.
179. Zyblewski SC, MD, Shirali GS, Atz A, Forbus G, Hlavacek A. Fetal Chromosomal Abnormalities Impact Parental Treatment Decision in Prenatally Diagnosed Congenital Heart Disease. AAP, San Francisco CA, 10/07

Books and Chapters:

1. Blafox AD, Saul JP. Chapter 90. Antiarrhythmic Drugs. In *The Science and Practice of Pediatric Cardiology*. Garson, Bricker, Fisher, Neish (Eds). Lippincott, Williams and Wilkins. Baltimore, 2005 (in press).
2. Bradley SM, Atz AM, Postoperative management: The role of mixed venous oxygen saturation monitoring, *Annual Update in Pediatric Cardiac Surgery 2005*
3. Feigin RD, Hlavacek AM. "Rickettsial Diseases." *Oski's Pediatrics* Ed. McMillan, Feigin RD, DeAngelis C, Jones MD. 4th ed. Philadelphia: Lippincott Williams & Wilkins. 2006, 985-997.
4. Friedman B, Barber BJ. Ventricular Septal Defect. *William and Wilkins' 5-Minute Clinical Consult*. Lippincott 2007.
5. Friedman B, Barber BJ. Pulmonary Valve Stenosis. *William and Wilkins' 5-Minute Clinical Consult*. Lippincott 2007.
6. Gajewski KK. Cardiology (Chapter 6). In: Robertson and Shilkofski, *The Harriet Lane Handbook*.
7. Graham EM, Atz AM: Pulmonary Artery Hypertension in the Setting of Cavopulmonary Anastomosis. In: Beghetti M ed. *Pulmonary Artery Hypertension Associated With Congenital Heart Disease*. Elsevier, 2006:67-74.
8. Haemmerich D. Chapter "Mathematical Modeling of Ablative Therapies", in "Tissue Ablation: Devices and Procedures", JG Webster, Ed, in press, 2007.
9. Haemmerich D. *Wiley Encyclopedia of Medical Devices and Instrumentation*, 2nd Ed., Chapter on "Tissue Ablation", John Wiley & Sons, 2006.
10. Haemmerich D. Tissue ablation. In: *Wiley Encyclopedia of Medical Devices and Instrumentation* (2nd Ed). Editor: John G. Webster. John Wiley & Sons, 2005 (in press).
11. Hannon DW, Fairbrother DL. Arrhythmias and cardiac pacing. In: Perkin RM, Swift JD, Newton DA, eds. *Pediatric Hospital Medicine*. Lippincott, Williams and Wilkins; Philadelphia, PA; 2003.
12. Hlavacek A, Mulvihill D. "CT Angiography with Three-Dimensional Reconstruction in Patients with Congenital Heart Disease." *Clinical Case Studies in the Third Dimension Vol 2*. TeraRecon, Inc 2006.
13. Korhonen I, Takalo R, Saul JP. Multivariate closed loop modeling of cardiopulmonary interactions. In: *The Proceedings of the 4th IFMBE-IMIA International Workshop on Biosignal Interpretation*, Villa Como, Italy, June 2002, pp 375-378.
14. Lucas JF, Saul JP. Innocent Murmurs. In: *Current Pediatric Therapy 18th edition*, Burg, Ingelfinger, Polin, Gershon (eds), Elsevier Science 2005 (in press).
15. Lucas JF, Shirali GS. Transcatheter Occluder Devices. In: *Fundamental Applications of Transesophageal Echocardiography*. SCA 2005 Monograph on DVD, Reeves ST, Shanewiae J (eds), Lippincott, Williams and Wilkins 2005 (in press).
16. Lucas JF, Shirali GS. The Occluder Devices. In: Reeves ST and Shanewise J, eds. *Society of Cardiovascular Anesthesiology: Fundamental Applications of Transesophageal Echocardiography*. Monograph on DVD, Lippincott, Williams and Wilkins, 2005.
17. McQuinn, T.C., A. Wessels. Embryology of the heart and great vessels. Chapter 1, *Pediatric Cardiac Surgery*, 3rd Edition, Ed. Mavroudis C., Backer T. Mosby, 2003.
18. Paul T, Blafox AD, Saul JP. Invasive electrophysiology and pacing. In *Management of Adult Congenital Heart Disease*. Webb G, Daubeney P, Gatzoulis MA (eds); Harcourt Publishers, London, 2005 (In Press).
19. Saul JP. Book Review. *Pacing Options in the Adult with Congenital Heart Disease*. Mond HG, Karpawich PP. Blakwell 2006. *Cardiol Young*: 2007.
20. Scheurer M, Shirali GS. Hypoplastic left heart syndrome: Native and post-Norwood. In: Paul J, Ed. *Pediatric Ultrasound Today*. Phoenix: Chresthomathic Press 2003 Num 4, Volume 8.
21. Scheurer MA, Atz AM, Palliative Procedures. In: *Pediatric Critical Care Medicine: Basic Science and Clinical Evidence*. Springer-Verlag, 2006 (in press)
22. Shirali GS. Cases: i) Subaortic Stenosis and ii) Coarctation of the aorta. In: Lang RM, Nanda N, Franke A, Collins KA, eds. *Live Three-Dimensional Transthoracic Echocardiography: Case Study World Atlas*. Compact Disc Supplement to *Echocardiography*, 22;1:2005

23. Shirali GS. Hypoplastic left heart syndrome. In: Crawford MH, DiMarco JP ed. *Cardiology*, 7:12. London: Mosby International, 2003.

Invited Talks:

1. Atz, 2003, Invited Speaker at Cardiology 2003, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia ,Orlando FL (2/03) Cardiac surgery in lethal chromosomal disorders
2. Atz, 2003, Invited Speaker at Cardiology 2003, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia ,Orlando FL (2/03) Current therapy for pulmonary hypertension
3. Atz, 2003, Congenital Scanning for the Adult and Pediatric Cardiac Sonographer, MUSC Charleston SC, (10/17/03) Important Neonatal Issues
4. Atz, 2004, Invited Speaker at American College of Cardiology Scientific Sessions 2004, New Orleans (3/09/04) Pre and postoperative management of the infant with single ventricle
5. Atz, 2004, Nitric Oxide: Treating Shunted Single Ventricle Patients; Pediatric Cardiac Perioperative/ Transplant Consensus Conference (4/1/04) Short Hills, NJ
6. Atz, 2004, Sickle Cell Disease and Nitric Oxide, Inotherapeutics, Inc training symposium, Clinton, NJ (4/15/04)
7. Atz, 2004, Pediatric Cardiac Nursing Conference, MUSC Charleston, SC (11/19/04) Aortic Abnormalities: Transposition of the Great Arteries and Coarctation
8. Atz, 2005, Charleston Mini Symposium- From Bench to Bedside, Charleston, SC (2/26/05) Pre and Postoperative Management of Hypoplasia of the Left Heart
9. Atz, 2005, Respiratory Care Service, Tampa General Hospital, Tampa FL (10/25/05) Current Trends in the Treatment of Pulmonary Hypertension
10. Atz, 2005, Respiratory Therapy Week Conference, Tampa General Hospital (10/25/05) Inhaled Nitric Oxide: Current On-Label and Off-Label Usage
11. Atz, 2005, Invited Speaker at Scientific Sessions of the American Heart Association (11/15/05) Surgical Outcomes: What Inquiring Parents (and Doctors) Want to Know in 2005. Dallas, TX
12. Atz, 2005, Invited Speaker at Pediatric Cardiac Intensive Care Symposium 2005 (12/8/05) Cardiac Issues in Neonatal Intensive Care: Principles of Perioperative Care, Miami, FL
13. Atz, 2006, Division of Pulmonology/Critical Care Teaching Conference, Riley Children's Hospital, Indianaopolis, IN (1/31/06) Current Uses of Inhaled Nitric Oxide
14. Atz, 2006, Department of Pediatrics Grand Rounds Riley Children's Hospital, Indianaopolis, IN (2/1/06) Use of Inhaled Nitric Oxide in the Pediatric Critical Care Environment
15. Atz, 2006, Invited Speaker at Cardiology 2006, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia, Scottsdale AZ (2/06) Cardiac Surgery in the Preterm Infant: Current Strategies and Results
16. Atz, 2006, Invited Speaker at Cardiology 2006, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia, Scottsdale AZ (2/06) The Importance of Supporting Research at the Bedside
17. Atz, 2006, Invited Speaker at Cardiology 2006, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia, Scottsdale AZ (2/06) Are We Justified in Performing Cardiac Surgery in the Neonate with "Lethal" Chromosomal Defects?
18. Atz, 2006, Minisymposium in Honor of Professor Sir Magdi Yacoub, Chalreston SC (3/6/06) The Pediatric Heart Network- Organization and Scope"
19. Atz, 2006, Invited Speaker at American College of Cardiology Scientific Sessions 2006, Atlanta (3/14/06) New Pharmacologies in the Congenital Armamentarium: Postoperative Care
20. Atz, 2006, Department of Pediatrics, Pediatric ICU Conference, DeVos Children's Hospital, Grand Rapids,MI (4/26/06) Inhaled Nitric Oxide in Congenital Heart Disease

21. Atz, 2006, Department of Pediatrics, Respiratory Care Conference, DeVos Children's Hospital, Grand Rapids, MI (4/26/06) Inhaled Nitric Oxide: "Shaking off the Label"
22. Atz, 2006, Network of Georgia Neonatologists (NOGAN) Annual Meeting (5/16/06) Perioperative Management of Hypoplasia of the Left Heart
23. Atz, 2006, Children's Health Care of Atlanta, Egelston Children's Hospital Department of Pediatrics Grand Rounds (5/17/06) Inhaled Nitric Oxide: "Going off Label"
24. Atz, 2006, University of Puerto Rico College of Medicine, Department of Pediatrics, San Juan, PR (8/21/06) "Inhaled Nitric Oxide: Current Therapy and Future Directions"
25. Atz, 2006, Neonatal Pharmacology Conference 2006, Incorporating Evidence-Based Practice into Clinical Decision Making, Charleston, SC (10/22/06) "Innovative Management Strategies for the Treatment of PPHN"
26. Atz, 2006, Invited Speaker at Scientific Sessions of the American Heart Association (11/06) Treatment of the Failing Fontan: How Effective is Medical Therapy for Prevention and Treatment. Chicago, IL
27. Atz, 2007, Invited Speaker at Cardiology 2007, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia, Orlando, FL (2/07) The Role of Mixed Venous Oxygen Saturation in the ICU
28. Atz, 2007, Invited Speaker at Cardiology 2007, Annual Update on Pediatric Cardiovascular Disease, Hosted by the Children's Hospital of Philadelphia, Orlando, FL (2/07) Outcome of the Fontan Procedure in Heterotaxy Patients
29. Atz, 2007, Invited Speaker at American College of Cardiology Scientific Sessions 2007, New Orleans (3/27/07) Intermediate Outcomes After the Fontan Procedure
30. Forbus, 2003, "Ebstein's anomaly and L-transposition of the great arteries" Lectures at the conference for Congenital Scanning for the Adult and Pediatric Cardiac Sonographer, Medical University of South Carolina, Charleston, SC (10/17/03).
31. Gajewski, 2007, Proctor for workshop in three-dimensional echocardiography, the Fifteenth Charleston Symposium on Congenital Heart Disease, Charleston, SC. May 2007.
32. Graham, 2005, 4th Annual Charleston Mini-Symposium on Pediatric Cardiology. Hypoplasia of the Left Heart. Illustrative Clinical Scenarios, Feb. 2005
33. Haemmerich, 2003, "Hepatic Radiofrequency Ablation – Current Shortcomings and Possible Solutions", Univ. Wisconsin-Madison, Dept. Surgery monthly seminar, January 2003.
34. Haemmerich, 2003, "Radiofrequency Ablation: Development of New Devices", NIH, Clinical Center & Dept. Diagnostic Radiology, Bethesda (MD), April 2003.
35. Haemmerich, 2003, "Ablative Therapies for Cancer Treatment", Univ. Wisconsin-Madison, Dept. Medical Physics Seminar, October 2003.
36. Haemmerich, 2004, Workshop on "Advances in High Temperature Technology" at International Conference on Hyperthermic Oncology (ICHO 2004), St. Louis (MO), April 2004.
37. Haemmerich, 2004, Minisymposium on Radiofrequency Ablation, "Hepatic RF ablation from an engineering perspective", IEEE EMBS conference 2004, San Francisco, September 2004.
38. Haemmerich, 2005, Engineering/Physics Symposium: "Investigation of different frequency ranges for radiofrequency tumor ablation", Annual Meeting of Society of Thermal Medicine, Bethesda (MD), March 2005.
39. Haemmerich, 2005, Workshop on "Tumor Ablation Therapy", Annual Meeting of Society of Thermal Medicine, Bethesda (MD), March 2005.
40. Haemmerich, 2007, "Tumor ablation – A thermally based local cancer treatment modality", Dept. Bioengineering Seminar, Clemson University, April 2007.
41. Haemmerich, 2007, "Computational Modeling of Tumor Ablation", Dept. Radiology, University of Texas Health Science Center at San Antonio, San Antonio (TX), June 2007.
42. Haemmerich, 2007, "Radiofrequency induced tissue heating as cancer treatment modality", Dept. of Electrical Engineering, University of Brasilia, Brasilia (Brazil), July 2007.
43. Haemmerich, 2007, "How does heat transfer affect lesion formation during radiofrequency current and cryoenergy application?", 4th Charleston Symposium on Interventional Pediatric Physiology, Charleston (SC), December 2007.

44. Hlavacek, 2005, Proctor for workshop in three-dimensional echocardiography, the Eighth Annual Update on Pediatric Cardiovascular Disease in Orlando, FL—Feb 2005
45. Hlavacek, 2005, Proctor for workshop in three-dimensional echocardiography, sponsored by Philips Medical Systems; Orlando, FL—June 2005.
46. Hlavacek, 2006, Proctor for workshop in three-dimensional echocardiography, the Ninth Annual Update on Pediatric Cardiovascular Disease in Scottsdale, AZ—Feb 2006
47. Hlavacek, 2007, Radiation exposure with CT Angiography—15th Charleston Symposium on Congenital Heart Disease, 5/2007
48. Hlavacek, 2007, Workshop on imaging and dataset manipulation with CT Angiography--15th Charleston Symposium on Congenital Heart Disease, 5/2007
49. McQuinn, 2002, “Endocardial-Mesenchymal Transformation” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
50. McQuinn, 2002, “Genetics and Molecular Biology of Situs Determination” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
51. McQuinn, 2002, “Normal Development of the Great Arteries” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
52. McQuinn, 2002, “Practical Genetics for Pediatric Cardiologists” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
53. McQuinn, 2002, “Themes in Cardiovascular Development” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
54. McQuinn, 2002, “Ventricular Septation” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
55. McQuinn, 2002, “Ventricular Septation” Charleston Heart Embryology, Echocardiography, and Pathology Symposium, Charleston, SC
56. McQuinn, 2003, “Development of the Great Vessels” Charleston Heart Embryology, Echocardiography, and Pathology Symposium, Charleston, SC
57. McQuinn, 2003, “Ventricular Septation” Charleston Heart Embryology, Echocardiography, and Pathology Symposium, Charleston, SC
58. McQuinn, 2005, “Function and Structure” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
59. McQuinn, 2005, “Going Molecular” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
60. McQuinn, 2005, “Myocardial Development” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
61. McQuinn, 2005, “Nonmyocardial Tissues in Cardiac Development” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
62. McQuinn, 2005, “Normal Development of the Great Arteries” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
63. McQuinn, 2005, “Pediatric Cardiology”. Presented to the Orangeburg Medical Society, Orangeburg, SC
64. McQuinn, 2005, “Situs Determination in Cardiac Development” AHA Six-Day Symposium on Congenital Heart Disease Embryology, Pathology, and Cardiac Imaging, Albuquerque, NM
65. McQuinn, 2007, “Bridging Clinical and Basic Science” Cardiology 2007 – Annual Update on Pediatric Cardiovascular Disease, Orlando, FL
66. McQuinn, 2007, “Development of the AV Junctions: A Bird’s Eye View” Fifteenth Charleston Symposium on Congenital Heart Disease “Integrating Traditionally Disparate Subdisciplines: The “Cutting” Edge of Development, Imaging, Surgery, and Intervention” Charleston, SC
67. McQuinn, 2007, “Development of the Outflow Tracts” Fifteenth Charleston Symposium on Congenital Heart Disease “Integrating Traditionally Disparate Subdisciplines: The “Cutting” Edge of Development, Imaging, Surgery, and Intervention” Charleston, SC
68. McQuinn, 2007, “Embryonic Ultrasonography”, Karolinum Institute, School of Medicine, Prague, Czech Republic

69. McQuinn, 2007, "How the Normal Heart Septates" Fifteenth Charleston Symposium on Congenital Heart Disease "Integrating Traditionally Disparate Subdisciplines: The "Cutting" Edge of Development, Imaging, Surgery, and Intervention" Charleston, SC
70. McQuinn, 2007, "Imaging Chick Embryos: A New Paradigm for Understanding Cardiac Development" Fifteenth Charleston Symposium on Congenital Heart Disease "Integrating Traditionally Disparate Subdisciplines: The "Cutting" Edge of Development, Imaging, Surgery, and Intervention" Charleston, SC
71. McQuinn, 2007, "Mechanics and AV Cushion Extracellular Matrix in AV Junction Development" Cardiology 2007 – Annual Update on Pediatric Cardiovascular Disease, Orlando, FL
72. McQuinn, 2007, "Working into Shape: In vivo Imaging of AV Canal Structure and Function During Development" Cardiology 2007 – Annual Update on Pediatric Cardiovascular Disease, Orlando, FL
73. McQuinn, 2002, "Genetics and Molecular Biology of Cardiac Laterality" Charleston Heart Embryology, Echocardiography, and Pathology Symposium, Charleston, SC
74. Pilcher, 2007, Oral presentation of "Cryoablation lesion size decreases with physiologic flow and increases with trabeculation" at HRS 2007 May 2007
75. Pilcher, 2007, Proctored 3D echocardiography workshops at the Fifteenth Charleston Symposium on Congenital Heart Disease May 2007
76. Ringewald, 2006, Congenital Cardiac Intervention 2006: Pediatric and Adult. Greenville Memorial Hospital Pediatric Grand Rounds fall 2006.
77. Saul, 2002, Director, Co-Organizer and Speaker, Charleston Symposium on Interventional Pediatric Electrophysiology, Kiawah Island, SC, March 14-16.
78. Saul, 2002, Speaker, Charleston Symposium on Interventional Pediatric Electrophysiology, Biophysical Aspects of Radiofrequency Current Application, Kiawah Island, SC, March 14-16.
79. Saul, 2002, Speaker, Charleston Symposium on Interventional Pediatric Electrophysiology, Role of Cooled Tip Technology, Kiawah Island, SC, March 14-16.
80. Saul, 2002, Speaker, Faculty, Twenty-Fourth Annual Carolina Cup Symposium, Evaluation and management of Syncope in the Pediatric Patient: Simple Faint or Malignant Event. Columbia, SC, March 29
81. Saul, 2002, Speaker, Faculty, Twenty-Fourth Annual Carolina Cup Symposium. Palpitations and Arrhythmia Basics Columbia, SC, March 29
82. Saul, 2002, Speaker, Clinical Tutorial on "Nightmare Cases in Pediatrics", NASPE, San Diego, CA, May 9.
83. Saul, 2002, Speaker, Meet the Experts Lunch on "Does Noninvasive Risk Stratification Have a Role in Patient Management", NASPE, May 10.
84. Saul, 2002, Speaker and Participant, Consensus Meeting on Baroreflex Sensitivity Indices Derived from Spontaneous Fluctuations of Blood Pressure and Heart Rate, European Society of Hypertension, Working Group on Blood Pressure and Heart Rate Variability (ESH-BAVAR), June 13-14, Maastricht, Netherlands
85. Saul, 2002, Speaker, General Faculty, Fifth Annual Frontiers in Pediatrics, Syncope in Children, Charleston, SC, December 6-8. 3.83/4.00.
86. Saul, 2002, Director, Organizer and Speaker, Update on Pediatric Cardiology for the Primary Care Clinician, "Fifth Frontiers in Pediatrics Conference," "Palpitations and Arrhythmia Basics" Charleston, SC, December 6-8.
87. Saul, 2003, Speaker, 2nd Charleston Symposium on Interventional Pediatric Electrophysiology, Considerations for Ablation Procedures in Pediatric Patients, Kiawah Island, SC, March 14-16.
88. Saul, 2003, Moderator, Third Annual Charleston Mini-Symposium on Pediatric Cardiology, "Systemic and pulmonary Veins", Charleston, SC, March 18-20
89. Saul, 2003, Speaker, Dennis Young Symposium, Meeting of the New York Pediatric Cardiology Society, "Evolving Techniques in Pediatric Catheter Ablation, 3D Mapping, Tip Cooling and Cryoablation", Montefiore Medical Center, New York, NY, April 9.
90. Saul, 2003, Director, Co-Organizer and Speaker, 2nd Charleston Symposium on Interventional Pediatric Electrophysiology, Kiawah Island, SC, May 11-13.
91. Saul, 2003, Scientific Committee, 5th International Conference on Bioelectromagnetism, Chicago, IL, May 12-15.

92. Saul, 2003, Speaker, Clinical Tutorial Session, Clinical Trials in Pediatric Patients, "Sotalol and other Drug Trials", NASPE, May 16.
93. Saul, 2003, Speaker, Pediatric Update, Sea Pines Course, USC Beaufort CME, "Evaluation and Management of Pediatric Syncope", Hilton Head, Island, July 22. Evaluation rating 4.79/5.00.
94. Saul, 2003, Speaker, Pediatric Update, Sea Pines Course, USC Beaufort CME, "Palpitations and Arrhythmia Basics: When to Worry, When to Refer", Hilton Head, Island, July 22
95. Saul, 2003, Speaker, Pediatric Update, Sea Pines Course, USC Beaufort CME, "Pediatric Hypertension", Hilton Head, Island, July 22
96. Saul, 2003, Speaker, Pediatric Update, Sea Pines Course, USC Beaufort CME, "Sudden Death in the Child,: Role of Sports Participation and Prevention, Focus on Commotio Cordis", Hilton Head, Island, July 23
97. Saul, 2003, Director, Organizer and Speaker, Update on Pediatric Cardiology for the Primary Care Clinician, Fifth Frontiers in Pediatrics Conference, "Arrhythmia Basics and Current management Techniques" Charleston, SC, December 5-7.
98. Saul, 2004, Co-Chair and Speaker, "Cryo Ablation and other Techniques" in Meet-the-Experts Symposium, ACC, New Orleans, LA March 10
99. Saul, 2004, Faculty and Speaker, "Cryo-ablation in Pediatrics, Unique Issues and Applications", Cryo-cath Symposium, New York, New York, March 27, 2004
100. Saul, 2004, Pediatric Grand Rounds Speaker, Greenville Hospital System, "Arrhythmias, Palpitations and Pacing: What Does the Pediatrician Need to Know", Greenville, SC, April 16
101. Saul, 2004, Faculty and Speaker, Mini-Course Catheter Ablation in Congenital Heart Disease, "Improvisation in the Very Small Child and When Vascular Access is Limited", NASPE, San Francisco, CA, May 19
102. Saul, 2004, Organizer and Co-Chair, Cryo-ablation Symposium, NASPE, San Francisco, CA, May 20
103. Saul, 2004, Visiting Professor, Qatar Medical Center, Doha, Qatar June 4-8
104. Saul, 2004, Speaker, Eplerenone in Pediatrics Trial Investigator Meeting, San Francisco, CA, June 26
105. Saul, 2004, Director, Organizer and Speaker, Update on Pediatric Cardiology for the Primary Care Clinician, "Seventh Annual Frontiers in Pediatrics" conference, Charleston, SC, December 3-5.
106. Saul, 2004, Speaker, MUSC Board of Visitors, "The Children's Heart Program of South Carolina", Dec 10
107. Saul, 2005, Co-Chair, "Issues in Arrhythmia Management", Symposium, ACC, Orlando, FL, March 8.
108. Saul, 2005, Speaker, Pediatric Grand Rounds, "Sudden Death in the Pediatric Patient: Focus on Long QT Syndrome". Lexington, KT, March 17.
109. Saul, 2005, Speaker, Third Qatari International Pediatric Conference, "Acute Management of Pediatric Cardiac Arrhythmia's in the Emergency Room", Doha, Qatar, April 9.
110. Saul, 2005, Workshop, Third Qatari International Pediatric Conference, "Pediatric Cardiac Rhythm", Doha, Qatar, April 9.
111. Saul, 2005, Director, Co-Organizer and Speaker, 3rd Charleston Symposium on Interventional Pediatric Electrophysiology, Kiawah Island, SC, May 1-3.
112. Saul, 2005, Speaker, 3rd Charleston Symposium on Interventional Pediatric Electrophysiology, Cryoablation of atrioventricular nodal reentrant tachycardia, Kiawah Island, SC, May 1-3.
113. Saul, 2005, Session Chair, Mini-Course, "Ablation Techniques for Treating Tachyarrhythmias in Congenital Heart Disease", Heart Rhythm Society, New Orleans, LA, May 4.
114. Saul, 2005, Invited Speaker, "Arrhythmias in the Adult with Congenital Heart Disease", Adult Cardiology Grand Round, Charleston, CS, June 16.
115. Saul, 2005, Faculty Speaker. "The Evaluation and Management of Syncope", Paediatric Cardiac Society of South Africa, 6th Annual Congress of the South African Heart Association, Draknesberg, SA, October 17.
116. Saul, 2005, Faculty Speaker. "The Pharmacologic Management of Paediatric Arrhythmias", Paediatric Cardiac Society of South Africa, 6th Annual Congress of the South African Heart Association, Draknesberg, SA, October 17.

117. Saul, 2005, Faculty Speaker. "Antagonist – All patients with SVT need electrophysiology study and ablation". 6th Annual Congress of the South African Heart Association, Draknesberg, SA, October 17.
118. Saul, 2005, Faculty Speaker. State-of-the-Art lecture. "Evolution and Revolution in Pediatric Cardiac Electrophysiology", Paediatric Cardiac Society of South Africa, 6th Annual Congress of the South African Heart Association, Draknesberg, SA, October 17.
119. Saul, 2005, Plenary Speaker. "Arrhythmias after Surgery for Congenital Heart Disease". 6th Annual Congress of the South African Heart Association, Draknesberg, SA, October 18.
120. Saul, 2005, Faculty Speaker. "Sudden Death in the Young: Focus on Sports Participation and Prevention". Fifteenth Annual Cardiology Symposium 2005. Columbia, SC, November 5th. Rating 4.8/5.0.
121. Saul, 2005, Faculty Speaker, Eighth Annual Frontiers in Pediatrics, Palpitations and Pediatric Arrhythmia Basics, What a Pediatrician Needs to Know. Charleston, SC, December 3.
122. Saul, 2006, Visiting Professor and Speaker, Department of Pediatrics, Rikshospitalet, Oslo, Norway. Supraventricular Tachycardia in Pediatrics, Evaluation and Management, Oslo, Norway. January 16-19th.
123. Saul, 2006, Co-Chair, "Issues in Arrhythmia Management", Symposium, ACC, Orlando, FL, March 8.
124. Saul, 2006, Speaker, Faculty, American College of Cardiology Training Forum, "Tracks and Promotion, Making Good Choices", Atlanta, GA, March 13.
125. Saul, 2006, Speaker, Core-Curriculum Session - "New Technologies in Fetal Arrhythmia Diagnosis", Heart Rate Variability., Heart Rhythm Society, Boston, MA, May 18.
126. Saul, 2006, Speaker, Meet the Experts Luncheon, "Cardiovascular Screening in the Athlete", Pediatric Issues. Heart Rhythm Society, Boston, MA, May 18.
127. Saul, 2006, Visiting Professor and Speaker, Department of Cardiology, Nairobi Hospital. "Sudden Death in the Young: Focus on Sports Participation and Prevention". Nairobi, Kenya. July 3-4th.
128. Saul, 2006, Speaker, Annual Meeting of the South Atlantic Society of Electrophysiology for Allied Professionals (SASEAP). "Supraventricular Tachycardia in the Pediatric Patient: Mechanisms, Evaluation and Management.", Myrtle Beach, SC, Sept 30.
129. Saul, 2006, Speaker, Faculty. Arrhythmias: From Neonate to Adult. "Role of Catheter Ablation in Post-Operative Arrhythmias". Groningen, Netherlands. October 12-13,
130. Saul, 2007, Visiting Professor and Pediatric Cardiology Program Reviewer, Department of Pediatrics, Rikshospitalet, Oslo, Norway. Oslo, Norway, January 15-18th.
131. Saul, 2007, Visiting Professor and Research Consultant, Columbia University, Department of Psychiatry & Behavioral Sciences. "Update on Heart Rate Variability: What's Old, What's New". February 21-22
132. Saul, 2007, Speaker, Faculty, American College of Cardiology Training Forum, "What is the Right Job?", Atlanta, GA, March 13.
133. Saul, 2007, Speaker, Faculty, American College of Cardiology Training Forum, "Tracks and Promotion, Making Good Choices", Atlanta, GA, March 26.
134. Saul, 2007, Speaker, Faculty and Conference Moderator, Cardiology in the Young, The Bonham Carter Lecture, "Sudden Death in the Young: Focus on Congenital Heart Disease". London, April 18.
135. Saul, 2007, Speaker, Faculty and Conference Moderator. Cardiology in the Young, Debate Protagonist, "There is no longer a place for surgery in the treatment of cardiac arrhythmias". London, April 19.
136. Saul, 2007, Speaker, Faculty and Conference Moderator. Cardiology in the Young, "Investigation and Treatment of Syncope". London, April 20.
137. Saul, 2007, Speaker, Faculty. 15th Charleston Symposium on Congenital Heart Disease. "Ablating In The Surgeon's Footsteps: 3D Electrical And Anatomic Mapping". Charleston, SC. May 2.
138. Saul, 2007, Speaker, Faculty. 15th Charleston Symposium on Congenital Heart Disease. "Early Postoperative Arrhythmias: Illustrative Cases". Charleston, SC. May 4
139. Saul, 2007, Speaker, Faculty. 15th Charleston Symposium on Congenital Heart Disease. "Early Postoperative Heart Block: Considerations For Pacing". Charleston, SC. May 4
140. Saul, 2007, Speaker, Faculty. 15th Charleston Symposium on Congenital Heart Disease. "15 Years After the First Pediatric RF Ablation: Where Are We Headed?" Charleston, SC. May 4
141. Saul, 2007, Faculty, Moderator. Sudden Cardiac Death in the Young Satellite Symposium. "Disease Based Review". Denver, CO. May 8.

142. Saul, 2007, Faculty, Moderator. "Treatment Strategies for Arrhythmias in Single Ventricle Patients". Heart Rhythm Society. Denver, CO. May 9.
143. Saul, 2007, Ross Visiting Professor in Pediatrics. Pediatric Grand Rounds. "Sudden Death in the Young: Mechanisms, Sports Participation and Prevention". University of Miami. Miami, FL. May 15.
144. Saul, 2007, Ross Visiting Professor in Pediatrics. Cardiology Conference. "Evolution and Revolution in Pediatric Cardiac Electrophysiology: Ablation and Devices". University of Miami. Miami, FL. May 15.
145. Saul, 2007, Ross Visiting Professor in Pediatrics. Coulter Weekly Research Conference. "Setting up a Regional Pediatric Cardiology Program and Clinical Research Environment:" University of Miami. Miami, FL. May 16.
146. Shirali, 2002, "Echocardiographic Aspects Of Transcatheter Closure Of Interatrial Communications". Institute of Child Health and Great Ormond Street Hospital for Children, London, UK, July 26, 2002.
147. Shirali, 2002, "Acquired Heart Disease in Childhood". Pediatrics Grand Rounds at Roper Hospital, Charleston, SC, October 31, 2002.
148. Shirali, 2003, "Anatomic Considerations In Transposition Of The Great Arteries". Annual Meeting of the Pediatric Cardiology Society of India, February 28 – March 2, 2003, Bombay, India.
149. Shirali, 2003, "Anatomic Considerations In Univentricular Heart". Annual Meeting of the Pediatric Cardiology Society of India, February 28 – March 2, 2003, Bombay, India.
150. Shirali, 2003, "Outcome Following Prenatal Identification Of The Norwood Candidate: The South Carolina Experience". Institute of Child Health and Great Ormond Street Hospital, London, UK, March 5, 2003.
151. Shirali, 2003, "Echocardiography In Systemic And Pulmonary Venous Anomalies". Third Annual Charleston Mini-Symposium on Congenital Heart Disease, March 18-20, 2003, Charleston, SC.
152. Shirali, 2003, "Echocardiography In Ventricular Septal Defects". Third Annual Charleston Mini-Symposium on Congenital Heart Disease, March 18-20, 2003, Charleston, SC.
153. Shirali, 2003, "Outcome Following Prenatal Identification Of The Norwood Candidate: The South Carolina Experience". Children's Hospital of San Diego, San Diego, CA, June 10, 2003.
154. Shirali, 2003, "Assessment Of The Candidate Donor Heart". 14th Annual Scientific Sessions of the American Society of Echocardiography, Las Vegas, NV, June 13, 2003.
155. Shirali, 2003, "Introduction To 3D Echocardiography". Cardiovascular-Thoracic Grand Rounds, Sentara Hospital, Norfolk, VA, September 16, 2003.
156. Shirali, 2003, "3D Echocardiography Of The Congenitally Bicuspid Aortic Valve". 22nd Southern Biomedical Engineering Conference and Symposium on Aortic Valve Sparing Surgery, Charlotte, NC, September 30, 2003.
157. Shirali, 2003, "Live 3D: Beyond Theory To Clinical Practice". Panel discussion, 7th World Congress of Echocardiography and Vascular Ultrasound, Buenos Aires, Argentina, October 10, 2003.
158. Shirali, 2003, "3D Echocardiography In Congenital Heart Disease". 7th World Congress of Echocardiography and Vascular Ultrasound, Buenos Aires, Argentina, October 11, 2003.
159. Shirali, 2003, "Implications And Limitations Of An Abnormal Fetal Echocardiogram". 7th World Congress of Echocardiography and Vascular Ultrasound, Buenos Aires, Argentina, October 11, 2003.
160. Shirali, 2003, "The Segmental Approach To Congenital Scanning". Congenital Scanning for the Adult and Pediatric Cardiac Sonographer, Charleston, SC, October 17, 2003.
161. Shirali, 2003, 'Pulmonary Valve Disease'. Congenital Scanning for the Adult and Pediatric Cardiac Sonographer, Charleston, SC, October 17, 2003.
162. Shirali, 2003, "Live 3D Echocardiography In Clinical Practice'. Bi-Annual Meeting of the Society of Pediatric Echocardiography, Orlando, FL, November 9, 2003.
163. Shirali, 2003, "3D Echocardiography In Congenital Heart Disease" as part of 'Live 3D Echo: Study with the Masters', Charleston, SC, November 15, 2003.
164. Shirali, 2003, "3D Echocardiography: Optimizing The Study" as part of 'Live 3D Echo: Study with the Masters', Charleston, SC, November 15, 2003.
165. Shirali, 2003, "Murmurs: Correlating What You Hear With What We See". Annual Frontiers in Pediatrics, (CME Conference hosted by the Medical University of South Carolina), December 6, 2003.

166. Shirali, 2004, "3D Echocardiography: Clinical Applications". Cardiovascular Revascularization Therapy 2004, Washington, D.C., May 5, 2004.
167. Shirali, 2004, "3D Echocardiography Tips and Tricks: The East Coast View". Live 3D Echo: Applications in Congenital Heart Disease, San Diego, CA, June 26, 2004.
168. Shirali, 2004, "Pulmonary Arterial and Venous Anomalies: Is Everyone a Fontan Candidate?" 15th Annual Scientific Sessions, American Society of Echocardiography, San Diego, CA, June 29, 2004.
169. Shirali, 2004, "Anatomic Considerations in l-TGA". Annual Meeting of the Pediatric Cardiology Society of India, Bangalore, India, August 28, 2004.
170. Shirali, 2004, "Anatomic Considerations in Double Outlet Right Ventricle". Annual Meeting of the Pediatric Cardiology Society of India, Bangalore, India, August 28, 2004.
171. Shirali, 2004, "3D Echocardiography in Congenital Heart Disease". August 30, 2004, Frontier Lifeline International Center for Cardiothoracic and Vascular Diseases, Madras, India.
172. Shirali, 2004, "Atrioventricular Septal Defect: 3D Echocardiographic Evaluation". Morphology and Imaging Correlation Symposium, Southeastern Pediatric Cardiology Society Meeting, September 9, 2004.
173. Shirali, 2004, "Current / Future Role of 3D Echocardiography in the Evaluation and Management of Congenital Heart Disease". Morphology and Imaging Correlation Symposium, Southeastern Pediatric Cardiology Society Meeting, September 9, 2004.
174. Shirali, 2004, "Three Dimensional Echocardiography". Congenital Cardiovascular Surgery Symposium, San Diego, CA, October 15-16, 2004.
175. Shirali, 2004, "Introduction to 3D Echocardiography" as part of 'Live 3D Echocardiography: Study with the Masters', Charleston, SC, October 23, 2004.
176. Shirali, 2004, "Optimizing The Study" as part of 'Live 3D Echocardiography: Study with the Masters', Charleston, SC, October 23, 2004.
177. Shirali, 2004, "Three Dimensional Echocardiographic Imaging of Atrial and Ventricular Septal Defects." Frontiers in Pediatrics, Charleston, SC, December 4, 2004.
178. Shirali, 2005, "Three Dimensional Echocardiography in Congenital Heart Disease". Great Ormond Street Hospital, London, UK, January 14, 2005.
179. Shirali, 2005, "Three Dimensional Echocardiography: Morphing". Workshop on 3D Echocardiography, All Children's Hospital, St. Petersburg, FL, February 10, 2005.
180. Shirali, 2005, "Three Dimensional Echocardiography". Grand Rounds at All Children's Hospital, St. Petersburg, FL, February 10, 2005.
181. Shirali, 2005, "Three Dimensional Echocardiography Will Replace Two Dimensional Echocardiography Within the Decade." Cardiology 2005: Eighth Annual Update on Pediatric Cardiovascular Disease, Orlando, FL, February 16, 2005.
182. Shirali, 2005, "Echocardiographic Evaluation of Atrioventricular Septal Defect". Fourth Charleston Echocardiography-Embryology-Pathology MiniSymposium on Congenital Heart Disease, Charleston, SC, February 25, 2005.
183. Shirali, 2005, "Echocardiographic Evaluation of Hypoplastic Left Heart". Fourth Charleston Echocardiography-Embryology-Pathology MiniSymposium on Congenital Heart Disease, Charleston, SC, February 26, 2005.
184. Shirali, 2005, "Echocardiographic Evaluation of Transposition of the Great Arteries". Fourth Charleston Echocardiography-Embryology-Pathology MiniSymposium on Congenital Heart Disease, Charleston, SC, February 27, 2005.
185. Shirali, 2005, "Current Status of Diagnosis and Treatment of Congenital Heart Disease in the USA". International Symposium on Congenital Heart Diseases and Echocardiography, Beijing, China, June 3, 2005.
186. Shirali, 2005, "Postoperative Evaluation of Congenital Heart Diseases". International Symposium on Congenital Heart Diseases and Echocardiography, Beijing, China, June 5, 2005.
187. Shirali, 2005, "Role of 3D Echocardiography in Congenital Heart Disease". 16th Annual Scientific Sessions of the American Society of Echocardiography, Boston, MA, June 15, 2005.

188. Shirali, 2005, "3-Dimensional Echocardiography Will Replace 2-Dimensional Echocardiography As A Major Imaging Modality by 2010". As part of "Controversies in Pediatric Echo", 16th Annual Scientific Sessions of the American Society of Echocardiography, Boston, MA, June 17, 2005.
189. Shirali, 2005, "Three Dimensional Echocardiography". Grand Rounds, Department of Adult Cardiology, Medical University of South Carolina, Charleston, SC, October 13, 2005.
190. Shirali, 2005, "A Cyanotic Marine In Iraq". 15th Annual International Conference on Echocardiography: Case Studies And Recent Advances, Dallas, TX, November 12, 2005.
191. Shirali, 2005, "How to Integrate Three Dimensional Echocardiography Into Everyday Clinical Practice", Annual Scientific Sessions, American Heart Association, Dallas, TX, November 14, 2005.
192. Shirali, 2006, Visiting Professor, Department of Pediatric Cardiology, Columbia University, New York, NY, January 6-7, 2006.
193. Shirali, 2006, "Three Dimensional Echocardiography in Congenital Heart Disease". Grand Rounds, Pediatric Cardiology, Columbia University Babies and Children's Hospital, New York, NY, January 6, 2006.
194. Shirali, 2006, Visiting Professor, Departments of Perinatology and Fetal Cardiology, Hamad Hospital, Doha, Qatar, January 28-30, 2006.
195. Shirali, 2006, "Fetal Cardiology: Program Development, Clinical Outcomes and Research". Lecture to Departments of Perinatology and Pediatric Cardiology, Hamad Hospital, Doha, Qatar, January 29, 2006.
196. Shirali, 2006, Invited Faculty, Two-Day Workshop on Fetal Echocardiography, Hamad Hospital, Doha, Qatar, January 28-29, 2006.
197. Shirali, 2006, "Three-Dimensional Imaging of the Ventricular Septum". Cardiology 2006: Ninth Annual Update on Pediatric Cardiovascular Disease, Scottsdale, AZ, February 11, 2006.
198. Shirali, 2006, "How to Bring Three Dimensional Technology Into Your Echocardiography Laboratory". Cardiology 2006: Ninth Annual Update on Pediatric Cardiovascular Disease, Scottsdale, AZ, February 11, 2006.
199. Shirali, 2006, "3D Imaging: Creating The Pictures". Annual Scientific Sessions, American College of Cardiology, Atlanta, GA, March 14, 2006.
200. Shirali, 2006, Visiting Professor, Royal Melbourne Children's Hospital, Melbourne, Australia, April 24, 2006.
201. Shirali, 2006, "3D Echocardiography in Pediatrics". Royal Melbourne Children's Hospital, Melbourne, Australia, April 24, 2006.
202. Shirali, 2006, Visiting Professor, Great Ormond Street Hospital, London, UK, May 23-24, 2006.
203. Shirali, 2006, "3D Echocardiography of The Ventricular Septum: New Perspectives". Great Ormond Street Hospital, London, UK, May 23, 2006.
204. Shirali, 2006, "Assessing Ventricular Function". Annual Meeting of the European Association of Pediatric Cardiology, Basel, Switzerland, May 25, 2006.
205. Shirali, 2006, "How To Set Up A Pediatric 3D Echocardiography Laboratory". Annual Meeting of the American Society of Echocardiography, Baltimore, MD, June 5, 2006.
206. Shirali, 2006, "3D Echocardiography in Adults With Congenital Heart Disease". Capital Area Echo Society, Bethesda, MD, September 14, 2006.
207. Shirali, 2006, "3D Echocardiography in Congenital Heart Disease". Children's Hospital of Philadelphia, Philadelphia, PA, September 15, 2006.
208. Shirali, 2006, "3D Echocardiography in Adults with Congenital Heart Disease". 13th Annual Joint Meeting, South Carolina and North Carolina Chapters, American College of Cardiology, Kiawah Island, SC, October 7, 2006.
209. Shirali, 2006, "3D Echocardiography in Congenital Heart Disease". Mayo Clinic, Rochester, MN, December 28, 2006.
210. Shirali, 2007, "3D Echocardiography of the Ventricular Septum". Pre-Conference Seminar 'In Depth Review of Cardiac Anatomy', Cardiology 2007, Orlando, FL, February 21, 2007.
211. Shirali, 2007, "3D Echocardiography of Inlet Abnormalities". Pre-Conference Seminar 'In Depth Review of Cardiac Anatomy', Cardiology 2007, Orlando, FL, February 21, 2007.

212. Shirali, 2007, "Image is Everything". Cardiology 2007, Tenth Annual Update on Pediatric Cardiovascular Disease, Orlando, FL, February 21, 2007.
213. Shirali, 2007, "The Clinician Educator". Career Planning for Trainees and Junior Faculty. Cardiology 2007, Tenth Annual Update on Pediatric Cardiovascular Disease, Orlando, FL, February 22, 2007.
214. Shirali, 2007, "3D Echocardiography in Atrioventricular Septal Defect". Cardiology 2007, Tenth Annual Update on Pediatric Cardiovascular Disease, Orlando, FL, February 24, 2007.
215. Shirali, 2007, "A Statewide Coordinated Program for Fetal Cardiology: Experiences from South Carolina." Cardiology 2007, Tenth Annual Update on Pediatric Cardiovascular Disease, Orlando, FL, February 24, 2007.
216. Shirali, 2007, "The Clinician Educator". Building a Successful Academic Career. Annual Scientific Sessions, American College of Cardiology, New Orleans, LA, March 26, 2007.
217. Shirali, 2007, "3D Echocardiography in Congenital Heart Disease". Annual Scientific Sessions, American College of Cardiology, New Orleans, LA, March 27, 2007.
218. Shirali, 2007, "3D Echocardiographic Imaging of the Atrioventricular Valves". 15th Charleston Symposium on Congenital Heart Disease, Charleston, SC, May 2, 2007.
219. Shirali, 2007, "3D Echocardiographic Imaging of the Outflow Tracts". 15th Charleston Symposium on Congenital Heart Disease, Charleston, SC, May 3, 2007.
220. Shirali, 2007, "3D Echocardiographic Imaging of the Ventricular Septum". 15th Charleston Symposium on Congenital Heart Disease, Charleston, SC, May 4, 2007.
221. Shirali, 2007, "Imaging The Heart: Future Directions in Echocardiography". 15th Charleston Symposium on Congenital Heart Disease, Charleston, SC, May 4, 2007.
222. Shirali, 2007, "Echocardiography in Septal Defects". 16th Annual Symposium on Adults With Congenital Heart Defects, Philadelphia, PA, May 28, 2007.
223. Shirali, 2007, "3D Echocardiography in Conotruncal Malformations". 16th International Parma Echo Meeting, Parma, Italy, June 27-29, 2007.
224. Shirali, 2007, "3D Echocardiography in AV Canal Defects". 16th International Parma Echo Meeting, Parma, Italy, June 27-29, 2007.
225. Shirali, 2007, "3D Echocardiography in Septal Defects". 16th International Parma Echo Meeting, Parma, Italy, June 27-29, 2007.
226. Shirali, 2007, "Echocardiographic Assessment of the Right Ventricle and Right Ventricular Outflow Tract". Pediatric Interventional Cardiology Symposium, Las Vegas, NV, July 25, 2007.
227. Shirali, 2007, "3D Echocardiographic Assessment of Atrial Septal Defects: Does it Really Help?". Pediatric Interventional Cardiology Symposium, Las Vegas, NV, July 25, 2007.
228. Shirali, 2007, "3D Echocardiography in Congenital Heart Disease". The Howard P. Gutgesell Echocardiography Symposium. Charlottesville, VA, September 20, 2007.
229. Shirali, 2007, "Case Presentations". 17th Annual International Conference on Echocardiography and Allied Techniques: Case Studies and Recent Advances. Orlando, FL, November 3, 2007.
230. Shirali, 2007, "How to use 3D Echocardiography in Clinical Practice". Annual Scientific Sessions, American Heart Association, Orlando, FL, November 5, 2007.
231. Shirali, 2007, "Live 3D Echo in Congenital Heart Defects: New Views and a New Paradigm". EuroEcho 2007, Lisbon, Portugal, December 7, 2007.
232. Shirali, 2007, "3D Echocardiography: Is it Worth The Cost in The Assessment of Congenital Heart Disease?" EuroEcho 2007, Lisbon, Portugal, December 8, 2007.
233. Zybiewski, 2007, Proctor for workshop in three-dimensional echocardiography, the Fifteenth Charleston Symposium on Congenital Heart Disease, Charleston, SC. May 2007.
234. Zybiewski, 2007, Case Presentation. Presented at the Fifteenth Charleston Symposium on Congenital Heart Disease, Charleston, SC. May 2007.

Ensuring A Meaningful Supervised Research Experience For Fellows

For purposes of board eligibility, the American Board of Pediatrics requires fellows to engage in projects in which they develop hypotheses or in projects of substantive scholarly exploration and analysis that require critical thinking. We have implemented a Scholarship Oversight Committee to oversee the supervised research experience of our fellows. It is the stated goal of our training program to develop pediatric cardiologists who will be active contributors to, if not leaders in, the future growth of the field. This requires long-term participation and investment by the fellows and faculty in clinical or basic science research. Building attitudes towards research is at least as important as building and then using the tools to perform research. Following extensive discussions among the faculty, we have reached some conclusions for developing productive long-term research habits and skills in our fellows. We address attitude at several levels. Judicious selection of fellows is important. We try hard to make it clear to all applicants that we are looking for individuals who want to do research and hope that they will remember that when they are filling out their match lists.

Every study that a pediatric cardiology fellow becomes involved in has a mentor assigned from the earliest stages of the project. The mentor need not be the senior author on the final manuscript but they do need to take responsibility for the fellow's guidance and supervision.

For many individuals a major difficulty in the process of publication of results is lack of practical experience or confidence in the writing process. We have employed the services of the on-campus [MUSC Writing Center](#) to assist trainees in learning appropriate writing strategies and techniques and to reduce their anxieties regarding writing skills. We have observed that peer success is a major determinant of fellow attitudes towards research. When one fellow succeeds in publication, they all grow in confidence. It is therefore important to keep the level of success high and to find mechanisms for each fellow to quickly share in the sense of achievement. We feel that the way to accomplish these goals is to begin our trainees' work on a case report, and soon after that, a straightforward retrospective study.

We begin the writing careers of most fellows with case reports, which are quickly completed and generally easily published. The success that these small projects bring is an important confidence builder. These projects always include an element of literature review and often provide experience in publication of medical images. Case reports are generally not hypothesis driven, but we believe that they have tremendous intrinsic value as a first publication step – and publication skills are a key part of the research equation. We begin providing suggestions for case reports in late summer or early fall of their first year, and we expect to have the case reports submitted by mid-spring of their first year.

The second step in their research training is a retrospective study. The criteria for acceptability are that the study should be readily accomplished and publishable, and should conform to the PDSA cycle, with an inherent potential for changing clinical practice. This is not the time for huge ambition and it is not the time for risky hypotheses. We have copied the typical mechanism of bench laboratories in initiation of new research careers – we tell fellows what the project is and supervise them as they do it, rather than asking them for originality or creativity at the first step in their project. It is the faculty's responsibility to identify projects and to have thought about them sufficiently to confirm their merit before asking a pediatric cardiology fellow to invest time in the faith that there will be a reward for the time spent.

When it is clear that the fellow has his/her retrospective study well in hand they, he/she will be encouraged to invest in additional research projects. Depending on the academic arena of greatest interest to the fellow, he/she may design prospective studies or retrospective studies. Although it is certainly desirable for every fellow to understand the techniques and methods of prospective clinical research, the time investment required to take a study to completion is sometimes not possible within the framework of the 18-24 months typically available to each fellow. We believe that in this era, the fellow ambitious enough to want to build a career performing prospective studies will need additional formal training in research trial design and methodology beyond that provided by the standard fellowship. Such fellows are encouraged to pursue the Clinical Scientist Pathway, which is funded by the T32 Training Grant. Dr. McQuinn is the Principle Investigator of the Training Grant and has the responsibility of supervision of the progress of fellows who are on this pathway. All fellows who are on this pathway have a team of mentors consisting of four members. The mentor teams include the Primary Mentor, who bears the traditional responsibilities of project definition, project environment and resources, investigational expertise, and day-to-day supervision. The additional mentors (Team Mentors) are identified by Dr. McQuinn and include at least one clinician and one basic scientist for each trainee. The 4th Team Mentor will be Dr. McQuinn, Dr. Hulsey or other member of our T32 Internal Advisory Committee, depending on the nature of the research project. Team Mentors are selected after the Primary Mentor and specific project have been determined. The mentoring teams meet formally as a group with the fellows twice per year to hear research progress reports. The analogies with traditional graduate student thesis committees are obvious and intended.

The goal of the Clinical Scientist Pathway is to provide fellows with the investigative tools and experience to make them candidates for K23 awards and other sources of external funding upon beginning their faculty careers. The training program is a combination of the highly successful mentor-apprentice model of basic science research training with a structured classroom experience. The apprenticeship consists of closely supervised clinical investigation through engagement with clinical projects. The potential scope of clinical research topics is broad, including studies of the pathogenesis of pediatric cardiac disease, normal human physiology and cardiac development, clinical epidemiology, prevention, health status, outcome studies,

evidence-based medicine, and clinical trials in pediatric cardiac disease. Studies of patient compliance, health care delivery, and field surveys are also relevant avenues. We have observed that the majority of pediatric cardiology fellows are most interested in disease pathogenesis, clinical cardiovascular physiology, evidence-based medicine, and clinical trials. While thus engaged in practical day-to-day clinical investigation the trainee will also be enrolled in the Master of Science in Clinical Research (MSCR) program. The MSCR program provides a formal and comprehensive structure to the research skills being acquired in a two-year program. The MSCR classroom environment is dynamic and interactive, so trainees will be observing and learning from the process of their 10-12 anticipated classmates' research project development as well. The graduation exercise for the MSCR is the preparation and defense of a grant proposal that has been prepared for extramural submission. Fellows enrolled in the MSCR will spend two afternoons per week in classroom activities. They may be assigned to 'full-time' clinical responsibilities for no more than 3 months per year; we use the term 'full-time' advisedly because their classroom attendance takes priority over clinical responsibilities. Clinical research activities occupy a minimum of 75% of the trainee's efforts while supported by this award. Rare candidates may have prior clinical research training or degrees (e.g., M.P.H. degree, Ph.D. in Biometry or Epidemiology) that may render the MSCR training partially or completely redundant in the judgment of the Advisory Committee. In those cases, selected specific graduate school courses may be recommended as suitable to the trainee's goals.

Since January 2005, a 'Clinical Research Conference' has been instituted, and is conducted every two months. Attendance by all fellows and faculty is mandated. At this conference, all fellows who are involved in research projects are expected to provide a summary of the progress that they have made on their project(s) during the prior two months, and to present their plan for specific tasks relating to their project that will be completed within the next two months. This conference has proven to be a strong motivational tool for junior fellows, while simultaneously encouraging efficiency and goal-directed efforts by fellows on their individual projects. Input from faculty at this conference encompasses a wide range of possibilities, including study design, statistical methods and the planned forum for submission of the manuscript. Since June 2007, a 'Clinical-Translational Research Conference' has been instituted. Dr. McQuinn conducts this conference weekly from June to August, and monthly in subsequent months (averaging once every 2 weeks for the year). The reason for the increased frequency of the conference at the beginning of the academic year is because this is the time when junior fellows who have completed the clinically-heavy first year of training can focus their attention on research, and identify areas of research inquiry that are most aligned with their clinical interests. This conference is intended as a more in-depth presentation of ideas and concepts. At each conference, a single fellow or faculty member presents his/her ideas and progress to the group. The Scholarship Oversight Committee is expected to attend these conferences. Attendance by all fellows and faculty is strongly encouraged.

Our pediatric cardiology fellowship training program provides additional incentives for academic productivity by provision of administrative leave and financial support for presentation of all abstracts and posters that are accepted for presentation at regional and national meetings.

Several excellent faculty outside of the Division of Pediatric Cardiology at MUSC are capable and willing to become mentors to pediatric cardiology fellows, have done so in the past, and are currently actively mentoring our trainees. Dr. Scott Bradley, our senior congenital heart surgeon, is an accomplished academician who takes active mentoring roles when pediatric cardiology fellows are performing retrospective or prospective clinical studies related to his surgical patients. Dr. Bradley has mentored several pediatric cardiology fellows and projects over the past five years. These include Dr. Robin Fountain-Dommer, whose study examined the role of prenatal diagnosis of hypoplastic left heart syndrome as a determinant of survival, Dr. Eric Graham, whose studies examined the differences in outcome following the use of two different approaches to provide pulmonary blood flow in the Norwood procedure for hypoplastic left heart syndrome, and Dr. Mark Scheurer, whose study examined the predictive value of tricuspid regurgitation in prognostication during staged palliation for patients with functionally univentricular hearts.

Dr. Andy Wessels has actively mentored two of our former fellows: Dr. Jon Lucas and Dr. Amy Juraszek in their Training Grant-sponsored basic research training. One of our current fellows, Dr. Javier Gonzalez, has recently started working in Dr. Wessels' laboratory. Dr. Wessels' research expertise is in cardiac developmental biology, and the pediatric cardiology fellows have found his laboratory to be a well organized, productive, and enjoyable experience. Because Dr. Wessels' work involves the morphological assessment of the developing heart in various experimental models, the fellows who have worked in his laboratory have become quite expert in embryology of the heart in a way that is directly relevant to understanding the morphology of congenital heart disease.

One of the unique features of our program is the opportunity for fellows to enroll in the Master's of Science in Clinical Research program. The graduation exercise for this program consists of presenting a grant that is intended for submission for extramural funding. The Scholarship Oversight Committee for MSCR enrollees includes several faculty from outside our division. For example, Dr. Anthony Hlavacek, who graduated from our program in 2007, was mentored by Dr. Denise Mulvihill from Pediatric Radiology, Dr. Dorothy Jenkins from Neonatology, Dr. Valerie Durkalski from Biostatistics. Dr. Hlavacek's research proposal was recently approved for federal funding. Dr. Thomas Hulsey, Director, Division of Pediatric Epidemiology, serves as mentor to Dr. Sinai Zyblewski, who is currently enrolled in the MSCR program.