

CURRICULUM VITAE

Alan Cheng, MD, MBA

DEMOGRAPHIC AND PERSONAL INFORMATION

Appointments

University

- 2018-present Associate Professor of Medicine (part time), Department of Medicine, Johns Hopkins University School of Medicine
- 2018-present Associate Professor of Pediatrics (part time), Department of Pediatrics, Johns Hopkins University School of Medicine
- 2016-2018 Adjunct Associate Professor, Department of Medicine, Johns Hopkins University School of Medicine
- 2016-2018 Adjunct Associate Professor, Department of Pediatrics, Johns Hopkins University School of Medicine
- 2013-2016 Associate Professor of Medicine, Department of Medicine, Johns Hopkins University School of Medicine
- 2006-2013 Assistant Professor of Medicine, Department of Medicine, Johns Hopkins University School of Medicine

Hospital

- 2017-present Attending Physician, Genesis Healthcare System, Zanesville, OH.

Other

- 2018-present Vice President, Cardiac Rhythm Management Therapy Development and Clinical Research, Medtronic, Inc.
- 2018-present Co-Chair, Medtronic Medical Safety Council

Personal Data

Medtronic, Inc.
8200 Coral Sea Street, Mailstop MVS-3
Mounds View, MN 55422
Tel 763-526-2588
E-mail alan.cheng@medtronic.com
alcheng@jhmi.edu

Education and Training

Undergraduate

- 1993 B.S., University of California, Los Angeles, CA; graduated summa cum laude, Phi Beta Kappa

Doctoral/Graduate

- 1997 Research Scholar, Immunology, Howard Hughes Medical Institutes-National Institutes of Health, Bethesda, MD
- 1998 M.D., Yale University, New Haven, CT
- 2018 M.B.A., Northwestern University, Evanston, IL

Postdoctoral

- 1998-1999 Intern, Internal Medicine, Johns Hopkins Hospital, Baltimore, MD
- 1999-2001 Resident, Internal Medicine, Johns Hopkins Hospital, Baltimore, MD
- 2001-2004 Fellowship, Cardiology, Dr. Gordon Tomaselli, Johns Hopkins Hospital, Baltimore, MD
- 2004-2006 Fellowship, Cardiac Electrophysiology, Dr. Hugh Calkins, Johns Hopkins Hospital, Baltimore, MD

Professional Experience

- 2002-2004 Critical Care Intensivist, Pulmonary and Critical Care Medicine, Mercy Medical Center, Baltimore, MD
- 2003-2006 Hospitalist, Medicine, Greater Baltimore Medical Center, Towson, MD
- 2006-2013 Assistant Professor, Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
- 2007-2008 Director, Pacing and ICD Service, Medicine, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 2010-2016 Director, Arrhythmia Device Service, Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
- 2011-2016 Founding Director, Cardiac Sarcoidosis Clinic, Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
- 2013-2016 Associate Professor, Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
- 2014-2016 Associate Professor, Pediatrics, Johns Hopkins University School of Medicine, Baltimore, MD
- 2016-present Vice President, Tachy Clinical Research, Medtronic, Inc., Mounds View, MN
- 2017-present Council Member, Medtronic Health Innovations Council, Medtronic, Inc., Mounds View, MN
- 2017-present Council Member, Medical Safety Council, Medtronic, Inc., Mounds View, MN

PUBLICATIONS

Original Research [OR]

1. Chen M, **Cheng A**, Chen YQ, Hymel A, Hanson EP, Kimmel L, Minami Y, Taniguchi T, Changelian PS, O'Shea JJ. The Amino Terminus of JAK3 Is Necessary and Sufficient for Binding to the Common Gamma Chain and Confers the Ability to Transmit IL-2 Mediated Signals. *Proc Natl Acad Sci USA* 1997; 94(13):6910-5.
2. Chen M, **Cheng A**, Candotti F, Zhou YJ, Hymel A, Fasth A, Notarangelo LD, O'Shea JJ. Complex Effects of Naturally Occurring Mutations in the JAK3 Pseudokinase Domain: Evidence for Interactions Between the Kinase and Pseudokinase Domains. *Mol Cell Bio* 2000; 20(3): 947-56.
3. Ng CM, **Cheng A**, Myers LA, Martinez-Murillo F, Jie C, Bedja D, Gabrielson KL, Hausladen JMW, Mecham RP, Judge DP, Dietz HC. TGF β -dependent Pathogenesis of Mitral Valve Prolapse in a Mouse Model of Marfan Syndrome. *J Clin Invest* 2004; 114(11):1586-92.
4. Piccini JP, Dalal D, Roguin A, Bomma C, **Cheng A**, Prakasa K, Dong J, Tichnell C, James C, Russell S, Crosson J, Marine JE, Tomaselli G, Calkins H. Predictors of Appropriate Implantable Defibrillator

- Therapies in Patients with Arrhythmogenic Right Ventricular Dysplasia. *Heart Rhythm* 2005; 2(11):1188-94.
5. Vasamreddy CR, Dalal D, Dong J, **Cheng A**, Spragg DD, Lamiy SZ, Meininger G, Henrikson CA, Marine JE, Berger R, Calkins H. Symptomatic and Asymptomatic Atrial Fibrillation in Patients Undergoing Radiofrequency Catheter Ablation. *J Cardiovasc Electrophysiol* 2006; 17(2):134-9.
 6. Cheema A, Vasamreddy CR, Dalal D, Marine JE, Dong J, Henrikson CA, Spragg D, **Cheng A**, Nazarian S, Sinha S, Halperin H, Berger R, Calkins H. Long-term Single Procedure Efficacy of Catheter Ablation of Atrial Fibrillation. *J Interv Card Electrophysiol* 2006; 15(3):145-55.
 7. Cheema A, Dong J, Dalal D, Vasamreddy CR, Marine JE, Henrikson CA, Spragg D, **Cheng A**, Nazarian S, Sinha S, Halperin H, Berger R, Calkins H. Long-term Safety and Efficacy of Circumferential Ablation with Pulmonary Vein Isolation. *J Cardiovasc Electrophysiol* 2006; 17(10):1080-5.
 8. Cheema A, Dong J, Dalal D, Marine JE, Henrikson CA, Spragg D, **Cheng A**, Nazarian S, Bilchick K, Sinha S, Scherr D, Almasry I, Halperin H, Berger R, Calkins H. Incidence and Time Course of Early Recovery of Pulmonary Vein Conduction after Catheter Ablation of Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2007; 18(4):387-91.
 9. Henrikson CA, Spragg DD, **Cheng A**, Capps M, DeVaughn K, Marine JE, Calkins H, Tomaselli GF, Berger, RD. Evidence for Electrical Remodeling of the Native Conduction System with Cardiac Resynchronization Therapy. *Pacing Clin Electrophysiol* 2007; 30(5):591-5.
 10. Schmidt A, Azevedo CF, **Cheng A**, Gupta SN, Bluemke DA, Foo TK, Gerstenblith G, Weiss RG, Marbán E, Tomaselli GF, Lima JAC, Wu KC. Infarct Tissue Heterogeneity By MRI Identifies Enhanced Cardiac Arrhythmia Susceptibility In Patients With Left Ventricular Dysfunction. *Circulation* 2007; 115(15):2006-14.
 11. Cheema A, Dong J, Dalal D, Marine JE, Henrikson CA, Spragg D, **Cheng A**, Nazarian S, Bilchick KC, Almasry I, Sinha S, Scherr D, Halperin H, Berger R, Calkins H. Circumferential Ablation With Pulmonary Vein Isolation in Permanent Atrial Fibrillation. *Am J Cardiol* 2007; 99(10):1425-8.
 12. Scherr D, Dalal D, Cheema A, **Cheng A**, Henrikson CA, Spragg D, Marine JE, Berger RD, Calkins H, Dong J. Automated Detection and Characterization of Complex Fractionated Atrial Electrograms in Human Left Atrium during Atrial Fibrillation. *Heart Rhythm* 2007; 4(8):1013-20.
 13. Dong J, Dalal D, Scherr D, Cheema A, Nazarian S, Bilchick K, Almasry I, **Cheng A**, Henrikson C, Spragg D, Marine J, Berger R, Calkins H. Impact of Heart Rhythm Status on Registration Accuracy of the Left Atrium for Catheter Ablation of Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2007; 18(12):1269-76.
 14. **Cheng A**, Nazarian S, Spragg D, Bilchick K, Tandri H, Mark L, Halperin H, Calkins H, Berger RD, Henrikson C. Effects of Surgical and Endoscopic Electrocautery on Modern Day Permanent Pacemaker and Implantable Cardioverter-Defibrillator Systems. *Pacing Clin Electrophysiol* 2008; 31(3):344-50.
 15. Spragg DD, Dalal D, Cheema A, Scherr D, Chilukuri K, **Cheng A**, Henrikson CA, Marine JE, Berger RD, Dong J, Calkins H. Complications of Catheter Ablation for Atrial Fibrillation: Incidence and Predictors. *J Cardiovasc Electrophysiol* 2008; 19(6):627-31.
 16. Scherr D, Dalal D, Henrikson CA, Spragg DD, Berger RD, Calkins H, **Cheng A**. Prospective Comparison of the Diagnostic Utility of a Standard Event Monitor versus a "Leadless" Portable ECG Monitor in the Evaluation of Patients with Palpitations. *J Interv Card Electrophysiol* 2008; 22(1):39-44.
 17. Scherr D, Dalal D, Cheema A, Nazarian S, Almasry I, Bilchick K, **Cheng A**, Henrikson C, Spragg D, Marine JE, Berger RD, Calkins H, Dong J. Long- And Short-Term Temporal Stability of Complex Fractionated Atrial Electrograms (CFAEs) in the Human Left Atrium during Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2009; 20(1):13-21.
 18. Berntsen RF, **Cheng A**, Calkins H, Berger RD. Evaluation of Spatiotemporal Organization of Longstanding Persistent Atrial Fibrillation with Time and Frequency Domain Measures in Human. *Europace* 2009; 11(3):316-23.

19. Chilukuri K, Henrikson CA, Dalal D, Scherr D, MacPherson EC, **Cheng A**, Spragg D, Nazarian S, Sinha S, Berger R, Marine JE, Calkins H. Incidence and Outcomes of Protamine Reactions in Patients Undergoing Catheter Ablation of Atrial Fibrillation. *J Interv Card Electrophysiol* 2009; 25(3):175-81.
20. Scherr D, Dalal D, Chilukuri K, Dong J, Spragg DD, Henrikson CA, Nazarian S, **Cheng A**, Berger RD, Abraham TP, Calkins H, Marine JE. Incidence and Predictors of Left Atrial Thombus Prior to Catheter Ablation of Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2009; 20(4):379-84.
21. Chilukuri K, Dalal D, Marine JE, Scherr D, Henrikson CA, **Cheng A**, Nazarian S, Spragg DD, Berger RD, Calkins H. Predictive Value of Obstructive Sleep Apnoea Assessed by the Berlin Questionnaire for Outcomes After the Catheter Ablation of Atrial Fibrillation. *Europace* 2009; 11(7):896-901.
22. Scherr D, Dalal D, Cheema A, Nazarian S, Almasry I, Bilchick K, **Cheng A**, Henrikson CA, Spragg D, Marine JE, Berger RD, Calkins H, Dong J. Long- and Short-term Temporal Stability of Complex Fractionated Atrial Electrograms in Human Left Atrium During Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2009; 20(1):13-21.
23. **Cheng A**, Dalal D, Fetics B, Angkeow P, Spragg DD, Calkins H, Tomaselli GF, Berger RD. Ibutilide-induced changes in temporal lability of ventricular repolarization in patients with and without structural heart disease. *J Cardiovasc Electrophysiol* 2009; 20:873-9.
24. Chilukuri K, Sinha S, Berger R, Marine JE, **Cheng A**, Nazarian S, Scherr D, Spragg D, Calkins H, Henrikson CA. Association of Transseptal Punctures with Isolated Migraine Aura in Patients Undergoing Catheter Ablation of Cardiac Arrhythmias. *J Cardiovasc Electrophysiol* 2009; 20(11):1227-30.
25. Chilukuri K, Sinha S, Berger RD, Marine JE, **Cheng A**, Nazarian S, Spragg DD, Calkins H, Henrikson CA. Association of Transseptal Punctures with Isolated Migraine Aura in Patients Undergoing Catheter Ablation of Cardiac Arrhythmias. *J Cardiovasc Electrophysiol* 2009; 20(11):1227-30.
26. Scherr D, Sharma K, Dalal D, Spragg DD, Chilukuri K, **Cheng A**, Dong J, Henrikson CA, Nazarian S, Berger RD, Calkins H, Marine JE. Incidence and Predictors of Periprocedural Cerebrovascular Accident in Patients Undergoing Catheter Ablation of Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2009; 20(12):1357-63.
27. Chilukuri K, Mayer SA, Scherr D, Dalal D, Abraham T, Henrikson CA, **Cheng A**, Nazarian S, Sinha S, Spragg D, Berger R, Calkins H, Marine JE. Transesophageal Echocardiography Predictors of Periprocedural Cerebrovascular Accident in Patients Undergoing Catheter Ablation of Atrial Fibrillation. *Europace* 2010; 12(11):1543-9.
28. Tompkins CA, **Cheng A**, Dalal D, Brinker JA, Leng CT, Marine JE, Nazarian S, Spragg DD, Sinha S, Halperin H, Tomaselli GF, Berger RD, Calkins H, Henrikson CA. Dual Antiplatelet Therapy And Heparin Bridging Significantly Increase the Risk of Bleeding at Device Implantation. *J Am Coll Cardiol* 2010; 55(21):2376-82.
29. Chilukuri K, Dukes J, Dalal D, Marine JE, Henrikson CA, Scherr D, Sinha S, Berger R, **Cheng A**, Nazarian S, Spragg D, Calkins H. Outcomes in patients requiring cardioversion following catheter ablation of atrial fibrillation. *J Cardiovasc Electrophysiol* 2010; 21(1):27-32.
30. Chow GV, Hirsch GA, Spragg DD, Cai JX, **Cheng A**, Ziegelstein RC, Marine JE. Prognostic Significance of Cardiac Troponin I Levels in Hospitalized Patients Presenting with Supraventricular Tachycardia. *Medicine (Baltimore)* 2010; 89(3):141-8.
31. Spragg DD, Dong J, Fetics BJ, Helm R, Marine JE, **Cheng A**, Henrikson CA, Kass DA, Berger RD. Optimal Left Ventricular Endocardial Pacing Sites for Cardiac Resynchronization Therapy in Patients with Ischemic Cardiomyopathy. *J Am Coll Cardiol* 2010; 56(10):774-81.
32. Chilukuri K, Dalal D, Gadrey S, Marine JE, Macpherson E, Henrikson CA, **Cheng A**, Nazarian S, Sinha S, Spragg D, Berger R, Calkins H. A Prospective Study Evaluating the Role of Obesity and Obstructive Sleep Apnea for Outcomes After Catheter Ablation of Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2010; 21(5):521-5.
33. **Cheng A**, Wang YF, Curtis JP, Varosy PD. Acute Lead Dislodgements and in Hospital Mortality: Findings from the NCDR ICD Registry. *J Am Coll Cardiol* 2010; 56(20):1651-6.

34. Tereshchenko LG, Han L, **Cheng A**, Marine JE, Spragg DD, Sinha S, Dalal D, Calkins H, Tomaselli GF, Berger RD. Beat-to-beat Three-dimensional ECG Variability Predicts Ventricular Arrhythmia in ICD Recipients. *Heart Rhythm* 2010; 7(11):1606-13.
35. Tereshchenko LG, **Cheng A**, Fetis BJ, Marine JE, Spragg DD, Sinha S, Calkins H, Tomaselli GF, Berger RD. Ventricular Arrhythmia is Predicted by Sum Absolute QRST Integral but not by QRS Width. *J Electrocardiol* 2010; 43(6):548-52.
36. Stempniewicz P, **Cheng A**, Connolly A, Wang XY, Calkins H, Tomaselli G, Berger RD, Tereshchenko L. Appropriate and Inappropriate Electrical Therapies Delivered by an Implantable Cardioverter-Defibrillator: Effect on Intracardiac Electrogram. *J Cardiovasc Electrophysiol* 2011; 22(5):554-60.
37. **Cheng A**, Nazarian S, Brinker JA, Tompkins C, Spragg DD, Leng CT, Halperin H, Tandri H, Sinha SK, Marine JE, Calkins H, Tomaselli GF, Berger RD, Henrikson CA. Continuation of Warfarin During Pacemaker or ICD Implantation: A Randomized Clinical Trial. *Heart Rhythm* 2011; 8(4):536-40.
38. De Ponti R, Marazzi R, Ghiringhelli S, Salerno-Uriarte JA, Calkins H, **Cheng A**. Superiority of Simulator-based Training Compared to Conventional Training Methodologies in the Performance of Transseptal Catheterization. *J Am Coll Cardiol* 2011; 58(4):359-63.
39. Tereshchenko LG, **Cheng A**, Fetis BJ, Butcher B, Marine JE, Spragg DD, Sinha S, Dalal D, Calkins H, Tomaselli GF, Berger RD. A New Electrocardiogram Marker to Identify Patients at low Risk for Ventricular Tachyarrhythmias: Sum Magnitude of the Absolute QRST Integral. *J Electrocardiol* 2011; 44(2):208-16.
40. Hoyt H, Nazarian S, Alhumaid F, Dalal D, Chilukuri K, Spragg D, Henrikson CA, Sinha S, **Cheng A**, Edwards D, Needleman M, Marine JE, Berger RD, Calkins H. Demographic Profile of Patients Undergoing Catheter Ablation of Atrial Fibrillation. *J Cardiovasc Electrophysiol* 2011; 22(9):994-8.
41. Liang HY, **Cheng A**, Chang KC, Berger RD, Agarwal K, Eulitt P, Corretti M, Tomaselli GF, Calkins H, Kass DA, Abraham TP. Influence of Atrial Function and Mechanical Synchrony on Left Ventricular Hemodynamics in Heart Failure Patients on Cardiac Resynchronization Therapy. *JACC Cardiovasc Imaging* 2011; 4(7):691-8.
42. Tompkins C, McLean R, **Cheng A**, Brinker JA, Marine JE, Nazarian S, Spragg DD, Sinha S, Halperin H, Tomaselli GF, Berger RD, Calkins H, Henrikson CA. End-stage Renal Disease Predicts Complications in Pacemaker and ICD Implants. *J Cardiovasc Electrophysiol* 2011; 22(10):1099-104.
43. Chilukuri K, Scherr D, Dalal D, **Cheng A**, Spragg D, Nazarian S, Barcelon BD, Marine JE, Calkins H, Henrikson CA. Conventional Pulmonary Vein Isolation Compared with the "Box Isolation" Method: A Randomized Clinical Trial. *J Interv Card Electrophysiol* 2011; 32(2):137-46.
44. Hoyt H, Bhonsale A, Chilukuri K, Alhumaid F, Needleman M, Edwards D, Govil A, Nazarian S, **Cheng A**, Henrikson CA, Sinha S, Marine JE, Berger R, Calkins H, Spragg DD. Complications Arising from Catheter Ablation of Atrial Fibrillation: Temporal Trends and Predictors. *Heart Rhythm* 2011; 8(12):1869-74.
45. Alhumaid F, **Cheng A**, Calkins H, Berger RD. Successful Cryothermal Ablation for Atrioventricular Nodal Reentry Tachycardia After Radiofrequency Ablation Failure. *J Interv Card Electrophysiol* 2012; 34(1):89-92.
46. **Cheng A**, Gold MR, Waggoner AD, Meyer TE, Seth M, Rapkin J, Stein KM, Ellenbogen KA. Potential Mechanisms Underlying the Effect of Gender on Response to Cardiac Resynchronization Therapy: Insights from the SMART-AV Multicenter Trial. *Heart Rhythm* 2012; 9(5):736-41.
47. Wu KC, Gerstenblith G, Guallar E, Marine JE, Dalal D, **Cheng A**, Marban E, Lima JAC, Tomaselli GF, Weiss RG. Combined Cardiac MRI and C-Reactive Protein Levels Identify a Cohort at Low Risk for Defibrillator Firings and Death. *Circ Cardiovasc Imaging* 2012; 5(2):178-86.
48. **Cheng A**, Wang YF, Curtis JP, Buxton AE, Berger RD, Calkins H, Lampert R. Electrophysiology Studies in Patients Undergoing ICD Implantation: Findings from the NCDR. *Pacing Clin Electrophysiol* 2012; 35(8):912-8.

49. Tereshchenko LG, McCabe A, Han L, Sur S, Huang T, Marine JE, **Cheng A**, Spragg DD, Sinha S, Calkins H, Stein K, Tomaselli GF, Berger RD. Intracardiac J-point elevation before the onset of polymorphic ventricular tachycardia and ventricular fibrillation in patients with an implantable cardioverter defibrillator. *Heart Rhythm* 2012; 9(10):1594-602.
50. **Bilchick KC**, Stukenborg G, Kamath S, **Cheng A**. Prediction of mortality in clinical practice for Medicare patients undergoing defibrillators for primary prevention of sudden cardiac death. *J Am Coll Cardiol* 2012; 60:1647-55.
51. **Cheng A**, Landman SR, Stadler RW. Reasons for loss of CRT pacing: Insights from 32,844 patients. *Circ Arrhythm Electrophysiol* 2012; 5:884-8.
52. Sasaki T, Miller CF, Hansford R, Yang J, Caffo BS, Zviman MM, Henrikson CA, Marine JE, Spragg D, **Cheng A**, Tandri H, Sinha S, Kolandaivelu A, Zimmerman SL, Bluemke DA, Tomaselli GF, Berger RD, Calkins H, Halperin HR, Nazarian S. Myocardial structural associations with local electrograms: a study of post-infarct ventricular tachycardia pathophysiology and magnetic resonance based non-invasive mapping. *Circ Arrhythm Electrophysiol* 2012; 5(6):1081-90.
53. Rickard J, **Cheng A**, Spragg DD, Cantillon D, Chung MK, Tang WH, Wilkoff BL, Varma N. QRS narrowing is associated with reverse remodeling in patients with chronic right ventricular pacing upgraded to cardiac resynchronization therapy. *Heart Rhythm* 2013; 10(1):55-60.
54. Han L, **Cheng A**, Sur S, Tomaselli GF, Berger RD, Tereshchenko LG. Complex assessment of the temporal lability of repolarization. *Int J Cardiol* 2013; 166(2):543-5.
55. Lin EF, Dalal D, **Cheng A**, Marine JE, Nazarian S, Sinha S, Spragg DD, Tandri H, Halperin H, Calkins H, Berger RD, Tomaselli GF, Henrikson CA. Predictors of high defibrillation threshold in the modern era. *Pacing Clin Electrophysiol* 2013; 36(2):231-7.
56. Tompkins C, **Cheng A**, Brinker JA, Marine JE, Nazarian S, Spragg DD, Sinha S, Halperin H, Tomaselli GF, Berger RD, Calkins H, Henrikson CA. Significance of leukocytosis after cardiac device implantation. *Am J Cardiol* 2013; 111(11):1608-12.
57. **Cheng A**, Dalal D, Butcher B, Norgard S, Zhang Y, Dickfeld T, Eldadah ZA, Ellenbogen KA, Guallar E, Tomaselli GF. Prospective observational study of implantable cardioverter defibrillators (PROSE-ICD) in primary prevention of sudden cardiac death: Study design and cohort description. *JAMA* 2013; 2(1):e000083.
58. **Zhang Y**, Post WS, **Cheng A**, Blasco-Colmenares E, Tomaselli GF, Guallar E. Thyroid hormones and electrocardiographic parameters: findings from the third national health and nutrition examination survey. *PLoS One* 2013; 8(4):e59489.
59. Dukes JW, Chilukuri K, Scherr D, Marine JE, Berger RD, Nazarian S, **Cheng A**, Spragg DD, Calkins H, Henrikson CA. The effect of antiarrhythmic medication management on atrial fibrillation ablation outcomes. *J Cardiovasc Electrophysiol* 2013; 24(8):882-7.
60. Ji SY, Dewire J, Barcelon B, Philips B, Catanzaro J, Nazarian S, **Cheng A**, Spragg DD, Tandri H, Bansal S, Kolandaivelu A, Sinha S, Marine JE, Calkins H, Berger RD. Phrenic nerve injury: an under recognized and potentially preventable complication of pulmonary vein isolation using a wide area circumferential ablation approach. *J Cardiovasc Electrophysiol* 2013; **in press**.
61. Lampert R, Olshansky B, Heidbuchel H, Lawless C, Saarel E, Ackerman M, Calkins H, Estes NAM, Link MS, Maron BJ, Marcus F, Scheinman M, Wilkoff BL, Zipes DP, Berul CI, **Cheng A**, Law I, Loomis M, Barth C, Brandt C, Dziura J, Li F, Cannom D. Safety of sports for athletes with implantable cardioverter-defibrillators: results of a prospective multinational registry. *Circulation* 2013; 127(20):2021-30.
62. Rickard J, Tarakji K, **Cheng A**, Spragg DD, Cantillon DJ, Martin D, Baranowski B, Gordon S, Tang WHW, Kanj M, Waszi OM, Wilkoff BL. Survival of patients with biventricular devices following device infection, extraction and reimplantation. *JACC Heart Fail* 2013; 1(6):508-13.
63. DeMazumder D, Lake DE, **Cheng A**, Moss TJ, Guallar E, Weiss RG, Jones S, Tomaselli GF, Moorman JR. Dynamic analysis of cardiac rhythms for discriminating atrial fibrillation from lethal ventricular arrhythmias. *Circ Arrhythm Electrophysiol* 2013; 6(3):555-61.

64. Rickard J, **Cheng A**, Spragg D, Bansal S, Niebauer M, Baranowski B, Cantillon DJ, Tchou PJ, Grimm RA, Tang WH, Wilkoff BL, Varma N. Durability of survival effect of cardiac resynchronization therapy by level of left ventricular functional improvement: fate of “non-responders”. *Heart Rhythm* 2013; 11(3):412-6.
65. Rickard J, **Cheng A**, Spragg D, Cantillon D, Baranowski B, Varma N, Wilkoff BL, Tang WH. A clinical prediction rule to identify patients at heightened risk for early demise following cardiac resynchronization therapy. *J Cardiovasc Electrophysiol* 2013; 25(3):278-82.
66. Rickard J, Tarakji K, **Cheng A**, Spragg D, Cantillon DJ, Martin DO, Baranowski B, Gordon SM, Tang WH, Kanj M, Wazni O, Wilkoff BL. Survival of patients with biventricular devices after device infection, extraction, and reimplantation. *JACC Heart Fail* 2013; 1(6):508-13.
67. Philips B, Madhavan S, James CA, te Riele AS, Murray B, Tichnell C, Bhonsale A, Nazarian S, Judge DP, Calkins H, Tandri H, **Cheng A**. Arrhythmogenic right ventricular dysplasia/cardiomyopathy and cardiac sarcoidosis: distinguishing features when the diagnosis is unclear. *Circ Arrhythm Electrophysiol* 2014; 7(2):230-6.
68. Rickard J, **Cheng A**, Spragg D, Green A, Leff B, Tang W, Cantillon D, Baranowski B, Wilkoff BL, Tchou P. Survival in octogenarians undergoing cardiac resynchronization therapy compared to the general population. *Pacing Clin Electrophysiol* 2014; 25(3):278-82.
69. Fender EA, Sibley CT, Nazarian S, **Cheng A**, Spragg DD, Marine JE, Berger RD, Calkins H, Lima JA, Brinker JA, Henrikson CA. Atrial septal angulation varies widely in patients undergoing pulmonary vein isolation. *J Invasive Cardiol* 2014; 26(3):128-31.
70. Catanzaro JN, Zviman M, Kolandaivelu A, Nazarian S, Halperin H, Berger RD, Brinker JA, **Cheng A**. Facilitation of transvenous lead extraction using site-specific delivery of electro-surgical energy. *IJC Heart Vessels*; 2014; 3:75-77.
71. Zhang Y, Kennedy R, Blasco-Colmenares E, Butcher B, Norgard S, Eldadah Z, Dickfeld T, Ellenbogen KA, Marine JE, Guallar E, Tomaselli GF, **Cheng A**. Outcomes in African-Americans undergoing cardioverter defibrillators implantation for primary prevention of sudden cardiac death: findings from The Prospective Observational Study of Implantable Cardioverter-Defibrillators (PROSE-ICD). *Heart Rhythm* 2014; 11(8):1377-83.
72. **Cheng A**, Zhang Y, Blasco-Colmenares E, Dalal D, Butcher B, Norgard S, Eldadah Z, Ellenbogen KA, Dickfeld T, Spragg DD, Marine JE, Guallar E, Tomaselli G. Protein biomarkers identify patients unlikely to benefit from primary prevention ICDs: Findings from the The PROSE-ICD Study. *Circ Arrhythm Electrophysiol* 2014; 7(6):1084-91.
73. Crawford T, Mueller G, Sarsam S, Prasitdumrong H, Chaiyen N, Gu X, Schuller J, Kron J, Nour K, **Cheng A**, Yong Ji S, Feinstein S, Gupta S, Ilg K Sinno M, Abu-hashish S, Ai-Mallah M, Sauer W, Ellenbogen K, Morady F, Bogun F. Magnetic resonance imaging for identifying patients with cardiac sarcoidosis and preserved or mildly reduced left ventricular function at risk of ventricular arrhythmias. *Circ Arrhythm Electrophysiol* 2014; 7(6):1109-15.
74. Zhang Y, Guallar E, Blasco-Colmenares E, Dalal D, Butcher B, Norgard S, Tjong FV, Eldadah Z, Dickfeld T, Ellenbogen KA, Marine JE, Tomaselli GF, **Cheng A**. Clinical and serum-based markers are associated with death within 1 year of de novo implant in primary prevention ICD recipients. *Heart Rhythm* 2015; 12(2):360-6.
75. Maxwell B, Stepan J, **Cheng A**. Complications of Catheter-based Electrophysiology Procedures in Adults with Congenital Heart Disease: A National Analysis. *J Cardiothorac Vasc Anesth* 2015; 29(2):258-64.
76. Zhang Y, Guallar E, Blasco-Colmenares E, Butcher B, Norgard S, Nauffal V, Marine JE, Eldadah Z, Dickfeld T, Ellenbogen KA, Tomaselli GF, **Cheng A**. Changes in follow-up left ventricular ejection fraction associated with outcomes in primary prevention ICD and CRT-D recipients. *J Am Coll Cardiol* 2015; 66(5):524-31.
77. Nauffal V, Tanawuttiwat T, Zhang Y, Rickard J, Marine JE, Butcher B, Norgard S, Dickfeld TM, Ellenbogen KA, Guallar E, Tomaselli GF, **Cheng A**. Predictors of mortality, LVAD implant or heart

- transplant in primary prevention cardiac resynchronization therapy recipients: the HF-CRT score. *Heart Rhythm* 2015; in press.
78. Khurram IM, Catanzaro JN, Zimmerman S, Zipunnikov V, Berger RD, **Cheng A**, Sinha S, Dewire J, Marine J, Spragg D, Ashikaga H, Halperin H, Calkins H, Nazarian S. MRI evaluation of radiofrequency, cryothermal and laser left atrial lesion formation in patients with atrial fibrillation. *Pacing Clin Electrophysiol* 2015; in press.
 79. Zhang Y, Blasco-Colmenares E, Harms AC, London B, Halder I, Singh M, Dudley SC, Gutmann R, Guallar E, Hankemeier T, Tomaselli GF, **Cheng A**. Serum amine-based metabolites and their association with outcomes in primary prevention implantable cardioverter defibrillator patients. *Europace* 2015; in press.
 80. Rickard J, Baranowski B, **Cheng A**, Spragg D, Tedford R, Mukherjee M, Tang WH, Wilkoff BL, Varma N. Comparative efficacy of cardiac resynchronization therapy in African Americans compared with European Americans. *Am J Cardiol* 2015; 116(7):1101-5.
 81. Tereshchenko LG, **Cheng A**, Park J, Wold N, Meyer TE, Gold MR, Mittal S, Singh J, Stein KM, Ellenbogen KA. Novel measure of electrical dyssynchrony predicts response in cardiac resynchronization therapy: results from the SMART-AV trial. *Heart Rhythm* 2015; 12(12):2402-10.
 82. Nauffal V, Zhang Y, Blasco-Colmenares E, Spragg DD, Marine JE, Butcher B, Norgard S, Guallar E, Tomaselli GF, **Cheng A**. Baseline troponin T levels modulate the effects of ICD shocks on all-cause mortality. *J Am Coll Cardiol* 2015; 66(25):2911-2.
 83. DeMazumder D, Limpitikul WB, Dorante M, Dey S, Mukhopadhyay B, Zhang Y, Moorman JR, **Cheng A**, Berger RD, Guallar E, Jones SR, Tomaselli GF. Entropy of cardiac repolarization predicts ventricular arrhythmias and mortality in patients receiving an implantable cardioverter-defibrillator for primary prevention of sudden death. *Europace* 2016; 18(12):1818-28.
 84. Sinha SK, Cain B, Flickinger K, Calkins H, Rickard J, **Cheng A**, Berger R, Tomaselli G, Marine JE. Cardiovascular implantable electronic device function and longevity at autopsy: an underestimated resource. *Heart Rhythm* 2016; 13(10):1971-6.
 85. Dawoud F, Spragg DD, Berger RD, **Cheng A**, Horacek BM, Halperin HR, Lardo AC. Non-invasive electromechanical activation imaging as a tool to study left ventricular dyssynchronous patients: implications for CRT therapy. *J Eletrocardiol* 2016; 49(3):375-82.
 86. Kruzan RM, Herzog CA, Wu A, Sang Y, Parekh MS, Matasushita K, Hwang S, **Cheng A**, Coresh J, Powe NR, Shafi T. Association of NTproBNP and cTnI with outpatient sudden cardiac death in hemodialysis patients: the Choices for Healthy Outcomes in Caring for ESRD (CHOICE) Study. *BMC Nephrol* 2016; 17:18.
 87. Zhang Y, Guallar E, Blasco-Colmenares E, Harms AC, Vreken RJ, Hankemeier T, Tomaselli GF, **Cheng A**. Serum-Based Oxylipins Are Associated with Outcomes in Primary Prevention Implantable Cardioverter Defibrillator Patients. *PLoS One* 2016; 11(6):e0157035.
 88. Sinha SK, Crain B, Flickinger K, Calkins H, Rickard J, **Cheng A**, Berger R, Tomaselli G, Marine JE. Clinical Inferences of Cardiovascular Implantable Electronic Device Analysis at Autopsy. *J Am Coll Cardiol* 2016; 68(12):1255-64.
 89. Nauffal V, Zhang Y, Tanawuttiwat T, Blasco-Colmenares E, Rickard J, Marine JE, Butcher B, Norgard S, Dickfeld TM, Ellenbogen KA, Guallar E, Tomaselli GF, **Cheng A**. Clinical decision tool for CRT-P vs. CRT-D implantation: Findings from PROSE-ICD. *PLoS One* 2017; 12(4):e0175205.
 90. Rickard J, Whellen D, Sherfese L, Peterson BJ, Nahey T, Tang AS, Ellenbogen KA, **Cheng A**. Characterization of health care utilization in patients receiving implantable cardioverter-defibrillator therapies: An analysis of the managed ventricular pacing trial. *Heart Rhythm* 2017; in press.
 91. Bilchick KC, Wang Y, **Cheng A**, Curtis JP, Dharmarajan K, Stukenborg GJ, Shadman R, Anand I, Lund LH, Dahlström U, Sartipy U, Maggioni A, Swedberg K, O'Conner C, Levy WC. Seattle Heart Failure and Proportional Risk Models Predict Benefit From Implantable Cardioverter-Defibrillators. *J Am Coll Cardiol* 2017; 69(21):2606-18.
 92. Lampert R, Olshansky B, Heidebuchel H, Lawless C, Saarel E, Ackerman M, Calkins H, Estes NAM, Link MS, Maron BJ, Marcus F, Scheinman M, Wilkoff BL, Zipes DP, Berul CI, **Cheng A***, Jordaens

- L, Law I, Loomis M, Willems R, Barth C, Broos K, Brandt C, Dziura J, Li F, Simone L, Vandenberghe K, Cannom D. Safety of Sports for Athletes With Implantable Cardioverter-Defibrillators: Long-Term Results of a Prospective Multinational Registry. *Circulation* 2017; 135(23):2310-2. *I was involved with data analysis and critical edits to the manuscript.
93. El Hage N, Jaar BG, **Cheng A**, Knight C, Blasco-Colmenares E, Gimenez L, Guallar E, Shafi T. Frequency of Arrhythmia Symptoms and Acceptability of Implantable Cardiac Monitors in Hemodialysis Patients. *BMC Nephrol* 2017;18(1):309.
 94. Henrikson CA, Sohail MR, Acosta H, Johnson EE, Rosenthal L, Pachulski R, Dan D, Paladino W, Khairallah FS, Gleed K, Hanna I, **Cheng A**, Lexcen DR, Simons GR. Antibacterial Envelope Is Associated with Low Infection Rates After Implantable Cardioverter-Defibrillator and Cardiac Resynchronization Therapy Device Replacement: Results of the Citadel and Centurion Studies. *JACC Clin Electrophysiol* 2017; 3(10):1158-67.
 95. Singh B, Zhang S, Ching CK, Huang D, Liu YB, Rodriguez DA, Hussin A, Kim YH, Chasnoits AR, Cerkenvenik J, Muckala KA, **Cheng A**. Improving the utilization of implantable cardioverter defibrillators for sudden cardiac arrest prevention (Improve SCA) in developing countries: clinical characteristics and reasons for implantation refusal. *Pacing Clin Electrophysiol* 2018; 41(12):1619-26.
 96. Olshansky B, Atteya G, Cannom D, Heidbuchel H, Saarel EV, Anfinson OG, **Cheng A**, Gold MR, Mussigbrodt A, Patton KK, Saxon LA, Wilkoff BL, Willems R, Dziura J, Li F, Brandt C, Simone L, Wilhelm M, Lampert R. Competitive athletes with implantable cardioverter defibrillators—How to program? Data from the Implantable Cardioverter-Defibrillator Sports Registry. *Heart Rhythm* 2019; 16(4):581-7.
 97. Zweibel S, Cronin EM, Schloss EJ, Auricchio A, Kurita T, Sterns LD, Gerritse B, Lexcen DR, **Cheng A**. Estimating the incidence of atrial fibrillation in single-chamber implantable cardioverter defibrillator patients. *Pacing Clin Electrophysiol* 2019; 42(2):132-8.
 98. Zhao D, Post WS, Blasco-Colmenares E, **Cheng A**, Zhang Y, Deo R, Pastor-Barriuso R, Michos ED, Sotoodehnia N, Guallar E. Racial differences in sudden cardiac death. *Circulation* 2019; 139(14):1688-97.
 99. Tarakji KG, Mittal S, Kennergren C, Corey R, Poole JE, Schloss E, Gallastegui J, Pickett RA, Evonich R, Philippon F, McComb JM, Roark SF, Sorrentino D, Sholevar D, Cronin E, Berman B, Riggio D, Biffi M, Khan H, Silver MT, Collier J, Eldadah Z, Wright DJ, Lande JD, Lexcen DR, **Cheng A**, Wilkoff BL. Antibacterial envelope to prevent infections of cardiac implantable devices. *N Engl J Med* 2019; 380(20):1895-905.
 100. Maan A, Sherfese L, Lexcen DR, Heist EK, **Cheng A**. Diurnal, seasonal and monthly variations in ventricular arrhythmias in patients with implantable cardioverter defibrillators. *JACC Clin Electrophysiol* 2019; 5(8):979-86.
 101. Joung B, Lexcen DR, Ching CK, Silver MT, Piccini JP, Sterns LD, Rabinovich R, Pickett RA, Liu S, Brown MML, **Cheng A**. Additional antitachycardia pacing programming strategies further reduce unnecessary implantable cardioverter defibrillator shocks. *Heart Rhythm* 2019; in press.
 102. Zhang S, Ching CK, Huang D, Liu YB, Rodriguez-Guerrero DA, Hussin A, Kim YH, Chasnoits R, Cerkenvenik J, Lexcen DR, Muckala K, Brown M, **Cheng A**, Singh B. Utilization of implantable cardioverter defibrillators for prevention of sudden cardiac death in emerging countries: Improve SCA clinical trial. *Heart Rhythm* 2019; in press.
 103. **Cheng A**, Auricchio A, Schloss EJ, Kurita T, Sterns LD, Gerritse B, Brown ML, Fagan DH, Lexcen DR, Ellenbogen KE. SVT discrimination algorithms significantly reduce the rate of inappropriate therapy in the setting of modern day high-rate detection programming. *J Cardiovasc Electrophysiol* 2019; in press.

Review Articles [RA]

1. Aringer M, **Cheng A**, Nelson JW, Chen M, Sudarshan C, Zhou YJ, O'Shea JJ. Janus Kinases and Their Role in Growth and Disease. *Life Sci* 1999; 64(24): 2173-86.

2. Braunstein JB, **Cheng A**, Cohn G, Aggarwal M, Nass CM, Blumenthal RS. Lipid Disorder: Justification of Methods and Goals of Treatment. *Chest* 2001; 120(3):979-988.
3. Braunstein JB, **Cheng A**, Fakhry C, Nass CM, Vigilance C, Blumenthal RS. The ABCs of Cardiovascular Disease Risk Management. *Cardiol Rev* 2001; 9(2):96-105.
4. **Cheng A**, Braunstein JB, Dennison C, Nass C, Blumenthal RS. Reducing Global Risk for Cardiovascular Disease: Evidence-Based Primary and Secondary Prevention. *Clin Cardiol* 2002; 25(5):205-12.
5. **Cheng A**, Helm RH, Abraham TP. Pathophysiology of Ventricular Dyssynchrony. *Europace* 2009; 11(Suppl 5):10-4.
6. **Cheng A**, Tereshchenko LG. Evolutionary innovations in cardiac pacing. *J Electrocardiol* 2011; 44(6):611-5.
7. Singh B, Russell S, **Cheng A**. Update on Device Technologies for Monitoring Heart Failure. *Curr Treat Options Cardiovasc Med* 2012; 14(5):536-49.
8. Tanawuttiwat T, **Cheng A**. Which Patients with AV Block Should Receive CRT Pacing? *Curr Treat Options Cardiovasc Med* 2014; 16(3):291-306.
9. Maan A, Mansour M, McManus DD, Patel VV, **Cheng A**, Ruskin J, Heist EK. Novel Therapeutic Targets in the Management of Atrial Fibrillation. *Am J Cardiovasc Drugs* 2014; 14(6):403-21.
10. Maan A, Mansour M, Anter E, Patel VV, **Cheng A**, Refaat MM, Ruskin JN, Heist EK. Obstructive sleep apnea and atrial fibrillation: Pathophysiology and implications for treatment. *Crit Pathw Cardiol* 2015; 14(2):81-5.
11. Gribble MO, **Cheng A**, Berger RD, Rosman L, Guallar E. Mercury exposure and heart rate variability: a systematic review. *Curr Environ Health Rep* 2015; 2(3):304-14.
12. Philips B, **Cheng A**. 2015 Update on the diagnosis and management of arrhythmogenic right ventricular cardiomyopathy. *Curr Opin Cardiol* 2016; 31(1):46-56.

Case Reports [CR]

1. **Cheng A**, Scheinfeld NS, McDowell B, Dokras A. Warfarin Skin Necrosis In A Postpartum Woman With Protein S Deficiency. *Obstet Gynecol* 1997; 90(4 pt 2):671-2.
2. **Cheng A**, Brinker JA, Reeves RC, Henrikson C. Novel Approach to Obtaining Vascular Access in Patients with Abandoned Endocardial Pacemaker and ICD Leads. *J Cardiovasc Electrophysiol* 2007; 18(3):339-41.
3. **Cheng A**, Calkins H. A Conservative Approach to Performing Transseptal Punctures Without The Use of Intracardiac Echocardiography: Stepwise Approach with Real-time Video Clips. *J Cardiovasc Electrophysiol* 2007; 18(6):686-9.
4. **Cheng A**, Calkins H, Berger RD. Managed Ventricular Pacing Below the Lower Rate Limit: Is It Simply Due to Ventricular Based Pacing? *Heart Rhythm* 2009; 6(8):1240-1.
5. Krebsbach A, Alhumaid F, Henrikson CA, Calkins H, Berger RD, **Cheng A**. Premature failure of a Riata defibrillator lead: Case report and Review of the Literature. *J Cardiovasc Electrophysiol* 2011; 22(9):1070-2.
6. Needleman M, Berger RD, **Cheng A**. Inhibition of tachytherapy during ventricular tachycardia in a patient with a functioning dual-chamber ICD: What is the mechanism? *Heart Rhythm* 2012; 9(3):467-9.
7. **Cheng A**, George RT. Mitral Annuloplasty Ring Dehiscence Demonstrated by Preablation Cardiac Computed Tomographic Angiography: Influence on Radiofrequency Ablation. *J Cardiovasc Comput Tomogr* 2012; 6(4):287-8.
8. Catanzaro JN, Brinker JA, Sinha SK, **Cheng A**. Abrasion of a DF-4 defibrillator lead. *J Cardiovasc Electrophysiol* 2013; 24(6):719.
9. Ji SY, Catanzaro J, Crosson JE, Brinker J, **Cheng A**. Use of an endoscopic bioprobe for extraction of a retained pacemaker lead tip. *Arch Med Sci* 2014; 10(4):853-4.
10. Jafri H, **Cheng A**. Pacemaker-Induced Tachycardia in a DDI-Programmed ICD: What is the Mechanism? *Heart Rhythm Case Reports* 2015; 1(4):198-200.

11. **Tanawuttiwat T, Cheng A, Rickard J, Chow GV, Sciortino CM, Brinker J.** Successful extraction of right ventricular lead remnants using the FlexCath steerable sheath. *J Inter Cardiovasc Electrophysiol* 2015; 45(1):107-10.

Book Chapters, Monographs [BC]

1. **Cheng A, Blumenthal RS.** Treatment: Medical Therapy Versus Coronary Angioplasty. In: American College of Cardiology Self Assessment Program VI, 2005.
2. Durrani MI, **Cheng A.** Exercise Care in the Use of Amiodarone and Alternative Antiarrhythmics for the Treatment of Atrial Fibrillation. In: Avoiding Common ICU Errors. Ed: Marcucci, Martinez, Haut, Slonim, Suarez. Lippincott, Williams and Wilkins, 2007.
3. **Cheng A, Tomaselli GF, Berger RD.** Prevention of Sudden Death in Patients at Risk: Channelopathies and Arrhythmic Syndromes in the Structurally Normal Heart. In: Cardiac Arrest: The Science and Practice of Resuscitation Medicine, 2nd ed. Ed: Paradis, Halperin, Kern, Wenzel, Chamberlain. Cambridge University Press, 2007.
4. **Cheng A, Yao FS.** Pacemakers and Implantable Cardioverter Defibrillators. In: Yao and Artusio's Anesthesiology, 6th Edition. Ed: Yao, Fun Sun. Lippincott, Williams and Wilkins, 2008.
5. **Cheng A, Shah A, Hogue CW.** Cardiac Electrophysiology: Diagnosis and Treatment. In: Kaplan's Cardiac Anesthesia. Ed: Kaplan, Joel A. Elsevier Saunders, 2009.
6. **Cheng A, Olshansky B.** Atrial fibrillation in patients with heart failure. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
7. **Cheng A, Podrid PJ.** Paroxysmal atrial fibrillation. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
8. **Cheng A, Kumar K.** Overview of atrial fibrillation. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
9. **Cheng A.** Surgical approaches to prevent recurrent atrial fibrillation. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
10. **Cheng A.** Sinoatrial nodal pause, arrest and exit block. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
11. **Cheng A.** Manifestations and causes of sick sinus syndrome. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
12. **Cheng A.** Noninvasive Evaluation of the Sick Sinus Syndrome. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2013.
13. **Cheng A.** Sinoatrial Node Pause, Arrest and Exit Block. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
14. **Cheng A.** Treatment of sick sinus syndrome. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2011-2016.
15. **Cheng A.** Anatomy and Electrophysiology of the Sinoatrial Node. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2012-2013.
16. **Cheng A.** Electrophysiologic Evaluation of the Sick Sinus Syndrome. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2012-2013.
17. **Cheng A, Hijazi ZM.** Nonpharmacologic Therapy to Prevent Embolization in Patients with Atrial Fibrillation. In: UpToDate, Basdow, DS (Ed), UpToDate, Waltham, MA. 2012-present.
18. **Cheng A, Yao FS.** Pacemakers, Implantable Cardioverter Defibrillators and Cardiac Resynchronization Therapy Devices. In: Yao and Artusio's Anesthesiology, 7th Edition. Ed: Yao, Fun Sun. Lippincott, Williams and Wilkins, 2011.
19. Rickard J, Nauffal V, **Cheng A.** Electrocardiograms in Biventricular Pacing. In: The ECG Handbook of Contemporary Challenges. Ed: Shenasa, Josephson, Estes. Cardiotext, 2015.
20. Hensley N, **Cheng A, Shah A, Hogue CW.** Cardiac Electrophysiology: Diagnosis and Treatment. In: Kaplan's Cardiac Anesthesia. Ed: Kaplan, Joel A. Elsevier Saunders, 2015.

21. **Cheng A**, Yao FS. Pacemakers, Implantable Cardioverter Defibrillators and Cardiac Resynchronization Therapy Devices. In: Yao and Artusio's Anesthesiology, 8th Edition. Ed: Yao, Fun Sun. Lippincott, Williams and Wilkins, 2016.
22. **Cheng A**, Crosson JE. ECG Cases of Complex Arrhythmias. In: ECG Masters' Collection: Favorite ECGs from Master Teachers Around the World. Ed: Shenasa M, Josephson ME, Estes NAM, Amsterdam EA, Scheinman M. Cardiotext, 2017.

Books, Textbooks [BK]

1. **Cheng A**, Zaas A (eds). The Osler Medical Handbook. Elsevier Science, ISBN: 0-3230-1930-7. Publication Date: April, 2003.

Consensus Statement [CS]

1. Crossley GH, Poole JE, Rozner MA, Asirvatham SJ, **Cheng A**, Chung MK, Ferguson TB Jr, Gallagher JD, Gold MR, Hoyt RH, Irefin S, Kusumoto FM, Moorman LP, Thompson A. The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the perioperative management of patients with implantable defibrillators, pacemakers and arrhythmia monitors: facilities and patient management: executive summary. This document was developed as a joint project with the American Society of Anesthesiologists (ASA) and in collaboration with the American Heart Association (AHA) and the Society of Thoracic Surgeons (STS). *Heart Rhythm* 2011; 8(7):1114-54.
2. Wilkoff BL, Fauchier L, Stiles MK, Morillo CA, Al-Khatib SM, Almendral J, Aquinaga L, Berger RD, Cuesta A, Daubert JP, Dubner S, Ellenbogen KA, Estes NAM 3rd, Fenelon G, Garcia FC, Gasparini M, Haines DE, Healey JS, Hurwitz JL, Keegan R, Kolb C, Kuck KH, Marinskis G, Martinelli M, McGuire M, Molina LG, Okumura K, Proclemer A, Russo AM, Singh JP, Swerdlow CD, Teo WS, Uribe W, Viskin S, Wang CC, Zhang S; Boriani G, Brignole M, **Cheng A**, Crawford TC, DiBiase L, Donahue K, Epstein AE, Field ME, Gorenek B, Huang JL, Indik JH, Israel CW, Jessup ML, Leclercq C, MacFadyen RJ, Madias C, Marquez MF, Olshansky B, Patton KK, Refaat MM, Tracy CM, Upadhyay GA, Vagenas D, Wang PJ. 2015 HRS/EHRA/APHRS/SOLAECE Expert Consensus Statement on Optimal Implantable Cardioverter-Defibrillator Programming and Testing: in partnership with and endorsed by the European Heart Rhythm Association (EHRA), the Asia Pacific Heart Rhythm Society (APHRS), and the Sociedad Latinoamericana de Estimulacion Cardiaca y Electrofisiologia (SOLAECE)-Latin American Society of Cardiac Pacing and Electrophysiology. Endorsed by the American College of Cardiology (ACC) and American Heart Association (AHA). *Europace* 2016; 18(2):159-83.

Editorials [ED]

1. Heston TF, **Cheng A**. Electrocardiographic markers of cardioversion success in patients with atrial fibrillation or flutter. *South Med J* 2009; 102(9):877-8.
2. **Cheng A**. Catheter Ablation for Atrial Fibrillation on Uninterrupted Warfarin: NEED it be Done WITH Echo Guidance? *J Cardiovasc Electrophysiol* 2011; 22(3):271-3.
3. **Cheng A**. Does Atrial Fibrillation Really Cause Strokes? *EP Lab Digest* 2015; 15(9): e1-3.

Letters, Correspondence [LT]

1. **Cheng A**, Mahajan A, Rozner M. Caution when Applying "Lessons" From Suresh et al. *Anesth Analg* 2012; 114(2):480.
2. De Ponti R, Calkins H, **Cheng A**. Reply to Training Methodology for Transseptal Catheterization Should Incorporate Difficult Anatomic Conditions and the Use of Intracardiac Echocardiographic Imaging. *J Am Coll Cardiol* 2012; 59(3): 292.
3. Wu KC, Gerstenblith G, Marine JE, Dalal D, **Cheng A**, Lima JA, Tomaselli GF, Weiss RG, Guallar E, Marban E. Response to letter regarding article, "combined cardiac magnetic resonance imaging

and C-reactive protein levels identify a cohort at low risk for defibrillator firings and death.” *Circ Cardiovasc Imaging* 2012; 5(4):e53.

Media Releases or Interviews [MR]

1. 9/29/15 Interviewed by Reporter Adam Hochron from MD Magazine, “Q&A with Alan Cheng from Johns Hopkins Hospital: Sudden Cardiac Death a Serious Concern for All Health Care Professionals” <http://www.mdmag.com/medical-news/qa-with-alan-cheng-from-johns-hopkins-hospital-sudden-cardiac-death-a-serious-concern-for-all-health-care-professionals>

Other Media (Videos, Websites, Blogs, Social Media, etc.) [OM]

1. 7/27/11 “Managing Heart Failure with Device Therapies and Surgery.” CME CardioCare Live Webcast: Heart Failure Education Summit: Evaluating Progress in Heart Failure.
2. 4/14/12 “National Guidelines Update: ACCF/AHA/HRS 2011 Focused Update for the Management of the Patient with Atrial Fibrillation.” Johns Hopkins CME Webcast.
3. 1/29/14 Youtube video. <https://www.youtube.com/watch?v=4pEshsLNNK4>
4. 5/1/2015 Twitter handle @alanchengep

FUNDING

Extramural Funding

Research Extramural Funding—Current

- | | |
|-------------------|---|
| 4/1/16—3/31/21 | <p>The MAESTRO-PAF Study: Major Adverse Events and Stroke in Paroxysmal Atrial Fibrillation
 R01 HL128595
 NIH/NHLBI
 \$485,420
 PI: Cheng A
 Role: Principal Investigator, 25%. There is strong association between atrial fibrillation (AF) and stroke but whether there is a causal relationship remains unclear. Prior studies aimed to evaluate this have been limited by the lack of continuous cardiac monitoring and small sample sizes. By combining the 3 major device company remote monitoring datasets, we will link the NCDR and the CMS datasets to these discrete episodes of AF to achieve the following specific aims: (1) assess if episodes of AF increase the short term risk of stroke and other major cardiovascular events; (2) estimate the long term increase in the risk of stroke and other cardiovascular events among those with AF and (3) estimate the rate of progression of paroxysmal AF to persistent AF.</p> |
| 12/15/16—11/30/21 | <p>Cardiac Arrhythmia Monitoring and Related Outcomes (CAMARO) Study
 R01 HL132372
 NIH/NHLBI
 \$519,873
 PI: Shafi, T
 Role: Co-Investigator, 10%. Patients with end stage renal disease currently being supported by hemodialysis have a high incidence of sudden cardiac death in the first few years of initiating therapy. The underlying arrhythmic mechanism behind these events is poorly understood. We will implant implantable loop monitors in patients on dialysis in an effort to achieve the following specific aims: (1) to estimate the risk of all-cause mortality and the risk of HF hospitalization associated with the presence of ventricular and atrial</p> |

arrhythmias in HD patients adjusting for patient characteristics, comorbidities, and medication use; (2) to estimate the differences in arrhythmic burden between Black and White HD patients and to evaluate if these differences mediate the race-survival paradox in HD; and (3) to evaluate if specific characteristics of the HD session (including electrolyte composition of the dialysate, hypotension during HD, excessive weight gain between HD sessions, ultrafiltration, time between HD sessions, and day of the week) are associated with the development of arrhythmias, and to assess if arrhythmias mediate the differences in the risk of outcomes associated with HD session characteristics.

Research Extramural Funding—Pending

7/18 resubmitting

Air Rhythm: A Nationwide Study of Air Pollution and Life Threatening Arrhythmias
NIH/NHLBI

PI: Cheng A

Role: Co-Principal Investigator, 20%. Sudden cardiac death is a major public health problem most commonly due to ventricular arrhythmias. Over the past decades, our knowledge of the cardiac conditions that act as susceptible substrate for SCD has increased substantially, but our understanding of triggering events remains limited. Particulate matter (PM) air pollution is an established trigger of acute myocardial infarctions, but the role of air pollution in triggering lethal ventricular arrhythmias is currently unclear. This study aims to leverage a nationwide sample of approximately 1 million individuals at risk for SCD with implantable cardioverter defibrillators (ICDs) from 2006 to 2015 and correlate the timing of their ventricular arrhythmic events with EPA data on local air pollution. The aims include (1) understanding the short-term increases in air pollution and how they may trigger ventricular arrhythmias and (2) understanding the long-term exposure to elevated levels of air pollution and its effect on arrhythmic risk.

Research Funding—Previous

7/1/02—6/30/03

DNA Microarray Analysis of Human Myocardial Tissue with Ventricular Systolic Dyssynchrony

American College of Cardiology Foundation-Merck Award

\$40,000

PI: Cheng, A

Role: Principal Investigator, 100%. Individuals with congestive heart failure with electrocardiographic evidence of intraventricular conduction abnormalities are at increased risk for all-cause mortality. This project aimed to (1) to investigate differences in gene expression between the endocardial septum and the lateral left ventricular free wall as a result of dyssynchronous ventricular activity in patients undergoing heart transplantation; (2) to apply DNA microarray gene chip technology in elucidating these differences; and (3) to correlate regional wall motion abnormalities with cellular mechanisms that may be associated with maladaptive remodeling in human heart failure.

7/1/04—6/30/06

Ameliorating the Cardiovascular Phenotype of Marfan Syndrome Through Genetic Strategies

National Marfan Foundation

\$100,000

PI: Cheng, A

Role: Principal Investigator, 100%. Marfan syndrome results from mutations in the fibrillin-1 gene and abnormal transforming growth factor-beta (TGF- β) signaling has been implicated in the pathogenesis of its associated cardiovascular pathology. This project had 2 specific aims: (1) to better understand the role of dysregulated TGF- β signaling in the pathogenesis of aortic aneurysms and cardiac disease in a mouse model harboring mutations in fibrillin-1 and (2) to determine the degree of amelioration of the cardiovascular phenotype by developing conditional “knock-out” mice harboring downstream signaling proteins that could constitute TGF- β signaling.

4/1/10—3/31/12

Cardiac Translational Research Implementation Program Primary ECG-MRI Risk Stratification

P20 HL101397

NIH/NHLBI

\$499,963

PI: Lima JAC

Role: Co-investigator, 5%. Sudden cardiac death (SCD) is one of the most common modes of death in developed countries. While patients with reductions in left ventricular ejection fraction are at greatest risk, the greatest number of SCD events in the United States occur in the general population without a prior history of cardiac disease. This study aims to use the Selvester scoring algorithm for the baseline ECG as screening tool for identifying patients with an increased myocardial scar burden which may prompt the need for MRI imaging and possible SCD risk stratification.

5/1/10—4/30/14

Fundamental Biology of Sudden Cardiac Death and its Application to Identify Patients at Risk

R01 HL091062

NIH/NHLBI

\$460,715

PI: Tomaselli, GF

Role: Co-investigator, 10%. Interactions between structural and functional abnormalities can be used to identify patients with structural heart disease at risk for sudden cardiac death. This is a prospectively, observational study with 4 specific aims: (1) to determine if baseline electrocardiographic (ECG) markers from signal-averaged electrocardiograms (a measure of conduction), heart rate variability (a measure of autonomic tone), QT variability (a measure of repolarization), and ventricular arrhythmia inducibility with programmed electrical stimulation can prospectively identify patients at increased risk for arrhythmic events; (2) to identify common sequence variations in candidate genes that are associated with an increased risk for arrhythmic events; (3) to generate an arrhythmia event risk profile based on combined clinical, ECG, serum protein and genetic biomarkers that can be prospectively tested in patients who are candidates for primary prevention ICDs and (4) to assess the utility of serial measurement of serum protein and ECG biomarkers, alone or in combination, in the prediction of arrhythmic event risk.

8/1/10—5/30/16

Metabolome-wide Analysis for the Risk Stratification of Sudden Cardiac Death

R01 HL103946

NIH/NHLBI

\$499,218

PI: Cheng, A

Role: Principal Investigator, 30%. Baseline serum metabolomic profiles of patients undergoing implantable cardioverter defibrillator (ICD) implantation for primary prevention of sudden cardiac death (SCD) may be able to predict those at high risk for ventricular arrhythmic events and SCD. This project has 3 specific aims: (1) to define the baseline metabolomic profile of patients with an increased risk for arrhythmic events by first deriving a set of lipid and oxylipid based metabolomes in a cohort of individuals with primary prevention ICDs. This derived set of metabolomes will then be validated in a separate and unrelated cohort of individuals with primary prevention ICDs; (2) to determine whether these metabolomes are associated with other currently used metrics for sudden death including signal-averaged ECGs, heart rate variability, QT variability and ventricular arrhythmia inducibility with programmed electrical stimulation; and (3) to examine the incremental value of this metabolome profile to the existing risk stratification algorithms currently in clinical practice.

Educational Extramural Funding

Current: None.

Pending: None.

Previous: None.

Clinical Extramural Funding

Current: None.

Pending: None.

Previous: None.

System Innovation or Quality Improvement Extramural Funding

Current: None.

Pending: None.

Previous: None.

Other Extramural Funding

Current: None.

Pending: None.

Previous:

2009-2011 Simulator-based Training of Electrophysiology Fellows on the Performance of Transseptal Punctures

No ID number

Biosense Webster, A Johnson and Johnson Company

\$15,000

PI: Alan Cheng, MD

Role: PI, 0.6 calendar

Notes: The performance of transseptal catheterizations has increased in the electrophysiology laboratories. Training postdoctoral fellows on the methodologies of this complex procedure is time consuming and can result in significant risk to patients. I submitted an investigator-initiated grant to study the superiority of a simulator in improving the educational process of training our fellows. I worked in collaboration with Dr. Roberto De Ponti (University of Insubria, Varese, Italy) who developed the original protocol for this tool. As a result of our efforts, we published the first manuscript demonstrating the superiority of a simulator-based training

protocol vs. conventional training in the performance of transseptal catheterizations (see citation #38).

INTRAMURAL Funding

Research Intramural Funding

Current: None.
Pending: None.
Previous: None.

Educational Intramural Funding

Current: None.
Pending: None.
Previous: None.

Clinical Intramural Funding

Current: None.
Pending: None.
Previous: None.

System Innovation or Quality Improvement Intramural Funding

Current: None.
Pending: None.
Previous: None.

Other Intramural Funding

Current: None.
Pending: None.
Previous: None.

CLINICAL ACTIVITIES

Clinical Focus: I have focused my clinical activities on managing patients with cardiac arrhythmias and have developed a specific focus on managing patients with implantable devices and those with cardiac sarcoidosis. I was the Director of the Arrhythmia Device Service, providing care to patients with pacemakers, defibrillators and other implantable cardiac monitoring devices. I also served as the primary device lead extractor, performing the most procedures annually in the greater Baltimore area. I also founded the cardiac sarcoidosis clinic.

Certification

Medical, other state/government licensure

1995	United States Medical Licensure Examination, Part 1
1996	United States Medical Licensure Examination, Part 2
2000	United States Medical Licensure Examination, Part 3
2002-present	State of Maryland Medical License (#D0058744), renewed 2003, 2004, 2006, 2008, 2010, 2012, 2014, 2016
2016-present	State of Minnesota Medical License (#61436), renewed 2017
2017-present	State of Ohio Medical License (#35.132203)

Board, other specialty certification

2001	Board Certified, American Board of Internal Medicine #203079
2006	Board Certified, Cardiovascular Diseases, American Board of Internal Medicine
2007	Board Certified, Cardiac Electrophysiology, American Board of Internal Medicine

Clinical Responsibilities

2006-2016	Attending Electrophysiologist, Division of Cardiology, 50%
2007-2008	Director, Pacing and ICD Service, Department of Medicine, Johns Hopkins Bayview Medical Center, 10%
2010-2016	Director, Arrhythmia Device Service, Division of Cardiology, Johns Hopkins Hospital, 10%
2011-2016	Director, Cardiac Sarcoidosis Clinic, Division of Cardiology, Johns Hopkins Hospital

Clinical Productivity

Not available.

Clinical Draw

Not available.

Membership in or Examiner for Specialty Board

None.

Clinical Program Building/Leadership

2006-2016	Johns Hopkins Greenspring Electrophysiology Clinic. I established an arrhythmia consultation clinic as well as a device clinic at the Johns Hopkins Greenspring Clinic. Prior to my arrival, there was no clinic present and all patients had to travel downtown to be seen at the Johns Hopkins Outpatient Center.
2007-2008	Pacing and ICD Service at The Johns Hopkins Bayview Medical Center. I served as the director of the pacemaker and ICD service where I took part in supervising 2 nurse practitioners and 1 physician associate in the inpatient and outpatient management of implantable cardiac devices. I also oversaw device recalls and advisories and served as the physician champion for the implementation of PaceArt, an electronic medical record system for managing patients with devices. 10% effort.
2010-2016	Arrhythmia Device Service at The Johns Hopkins Hospital. I serve as the director of the pacemaker and ICD clinics. I directly supervise 3 registered nurses/technicians in the daily management of cardiac implantable devices. I oversee and provide management of device-related advisories and recalls. I am one of only two physicians at the Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center capable of device and lead extractions. 10% effort.
2011-2016	Cardiac Sarcoidosis Clinic at The Johns Hopkins Hospital. I serve as founding director of the Johns Hopkins Cardiac Sarcoidosis Clinic where we provide consultative services to patients with suspected or confirmed cardiac sarcoidosis. We have accepted consultations from across the country and Canada. I work in collaboration with my colleagues from the Heart Failure service and the Pulmonary Division, 20% effort.

Clinical Demonstration Activities

9/20-26/09	Demonstrated surgical techniques on pacemaker implantation to group of local cardiologists in Trinidad and Tobago.
3/7-13/10	Demonstrated surgical techniques on pacemaker implantation to physicians in Trinidad and Tobago.

- 10/17-23/10 Demonstrated surgical techniques on defibrillator implantation to local physicians in Trinidad and Tobago.
- 11/7-13/10 Demonstrated complex ablation techniques for supraventricular arrhythmias to local electrophysiologist in Trinidad and Tobago.
- 2/20-23/11 Demonstrated complex ablation techniques for supraventricular arrhythmias to local electrophysiologist in Trinidad and Tobago.
- 3/13-19/11 Demonstrated surgical techniques on defibrillator implantation to physicians in Trinidad and Tobago.
- 7/31-8/6/11 Demonstrated surgical techniques in device pocket closure to local surgeons in Trinidad and Tobago.
- 10/23-29/11 Demonstrated surgical techniques in pacemaker implantation to local physicians in Trinidad and Tobago.
- 11/27-12/3/11 Demonstrated surgical techniques in defibrillator implantation to physicians in Trinidad and Tobago.
- 5/18-19/12 Directed a hands-on program on basic cardiac anatomy and techniques involved with implantation of cardiac resynchronization therapy leads in Austin, TX.
- 6/10-15/12 Proctored physicians in pacemaker implantation in Trinidad and Tobago.
- 6/15-16/12 Directed a hands-on program on transseptal puncture techniques in Austin, TX.
- 1/24-26/13 Demonstrated fluoroscopic screening of defibrillator lead malfunctions in Bermuda.
- 4/12-13/13 Directed a hands-on program on basic cardiac anatomy and lead implantation in Austin, TX.
- 11/1-2/13 Directed a hands-on program on basic cardiac anatomy and lead implantation in Austin, TX.
- 3/20/14 Demonstrated approach to interpreting intracardiac electrograms in Los Angeles, CA.
- 3/20-21/15 Directed a hands-on program on transseptal puncture techniques in Austin, TX.

Development of nationally/internationally recognized clinical standard of care

- 2011 Developed an approach to manage patients with implantable devices in the perioperative period. Many of the processes I developed were incorporated in the Heart Rhythm Society Consensus document published as Crossley GH, Poole JE, Rozner MA, Asirvatham SJ, **Cheng A**, Chung MK, Ferguson TB Jr, Gallagher JD, Gold MR, Hoyt RH, Irefin S, Kusumoto FM, Moorman LP, Thompson A. The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the perioperative management of patients with implantable defibrillators, pacemakers and arrhythmia monitors: facilities and patient management: executive summary. This document was developed as a joint project with the American Society of Anesthesiologists (ASA) and in collaboration with the American Heart Association (AHA) and the Society of Thoracic Surgeons (STS). *Heart Rhythm* 2011; 8(7):1114-54.

EDUCATIONAL ACTIVITIES

Educational Focus: My educational focus has been on teaching postdoctoral fellows the fundamental mechanisms for arrhythmias and management approaches in the clinical setting.

Teaching

Classroom Instruction

JHMI/Regional

- 2008-09 Instructor for 10-15 medical students, Second Year Medical School Core Curriculum, Arrhythmia Small Group, Johns Hopkins University School of Medicine, Baltimore, MD

- 2010-11 Lecturer, "Sudden Cardiac Death and ICDs," Second Year Medical School Core Curriculum, Johns Hopkins University School of Medicine, Baltimore, MD
- 2010-11 Lecturer, "Clinical Correlates: SVT," Second Year Medical School Core Curriculum, Johns Hopkins University School of Medicine, Baltimore, MD

National

None.

International

- 5/4/2015 Visiting Lecturer, "Device Lead Management," Sun Yat-Sen University Cardiology Postdoctoral Training Program, Guangzhou, China

Clinical Instruction

JHMI/Regional

- 2006-2008 Attending, residents and fellows, cardiac intensive care unit, 4 weeks/year, Johns Hopkins Bayview Medical Center
- 2006-2016 Attending, cardiac electrophysiology postdoctoral fellows, electrophysiology laboratories, 1.5 days/week, 40 weeks/year, Johns Hopkins Hospital
- 2006-2016 Attending, postdoctoral cardiology fellows, electrophysiology consultation service, 4-6 weeks/year, Johns Hopkins Hospital
- 2006-2016 Attending, cardiac electrophysiology postdoctoral fellows, outpatient clinic, 1 day/week, 40 weeks/year, Johns Hopkins Hospital and Johns Hopkins Greenspring Clinic
- 2011-2016 Attending, Longcope Firm Faculty, 3 weeks/year, Johns Hopkins Hospital

National

None.

International

None.

CME Instruction

JHMI/Regional

- 1/19/06 Speaker, "Perioperative Management of Pacemakers and ICDs," Surgery and Anesthesia Grand Rounds, Johns Hopkins Hospital, Baltimore, MD
- 12/4/08 Speaker, "Primary Prevention ICDs: Too Much of A Good Thing?" Johns Hopkins Dinner Lecture Series, Oregon Grille Restaurant, Hunt Valley, MD
- 12/5/08 Speaker, "Primary Prevention ICDs: What Happens when the Dust Settles?" Department of Medicine Grand Rounds, Johns Hopkins Hospital, Baltimore, MD
- 4/29/09 Speaker, "Primary Prevention ICDs: The 7th Inning Stretch," Division of Cardiology Grand Rounds, Johns Hopkins Hospital, Baltimore, MD
- 5/5/09 Speaker, "Are You Ready for Your Pacemaker? 2009 Update" Topics in Internal Medicine Annual Meeting, Johns Hopkins Hospital, Baltimore, MD
- 7/12-17/09 Speaker, "Arrhythmias," Johns Hopkins Internal Medicine Board Review, Baltimore, MD
- 7/12-17/09 Speaker, "ECG Review," Johns Hopkins Internal Medicine Board Review, Baltimore, MD
- 2/18-20/10 Speaker, "True and False About ICDs: What we Have Learned Since MADIT II," Nicholas Fortuin Topics in Cardiology, Baltimore, MD

- 2/17-19/11 Speaker, "New Boxes, Bells and Benefits: 2011 Update on Device-Based Therapies," Nicholas Fortuin Topics in Cardiology, Baltimore, MD
- 2/16-18/12 Speaker, "Updates on Management of Atrial Fibrillation," Nicholas Fortuin Topics in Cardiology, Baltimore, MD
- 7/7/12 Speaker, "Device Therapy for Congestive Heart Failure and Sudden Cardiac Death," Bangladesh Medical Association of North America 32nd Annual Convention, Baltimore, MD
- 5/6-10/13 Speaker, "ICDs: Are They Really Saving Lives?" Topics in Medicine, Johns Hopkins University, Baltimore, MD
- National*
- 5/9-12/07 Speaker, "Effects of Electromagnetic Interference on Modern Day Pacemakers and ICDs," Heart Rhythm Society 28th Annual Scientific Session, Denver, CO
- 5/9-12/07 Speaker, "A Simple Method of Optimizing the Atrioventricular Interval Using the Surface ECG," Heart Rhythm Society 28th Annual Scientific Session, Denver, CO
- 10/18-21/07 Speaker, "The ABCs of Implantable Devices," American Association of Cardiovascular and Pulmonary Rehabilitation 22nd Annual Meeting, Salt Lake City, UT
- 5/14-17/08 Speaker, "All Transseptal Catheterizations in the EP Lab Should be Guided by Intracardiac Echocardiography," Heart Rhythm Society 29th Annual Scientific Session, San Francisco, CA
- 5/14-17/08 Speaker, "Finding the Target: Is There Really A Sweet Spot in LV Pacing?" Heart Rhythm Society 29th Annual Scientific Session, San Francisco, CA
- 11/8-13/08 Speaker, "Clinical Characteristics of Patients Experiencing Inappropriate Shocks from Primary Prevention ICDs: Findings from the PROSE-ICD Registry," American Heart Association Annual Scientific Session, New Orleans, LA
- 5/13-16/09 Speaker, "Patient Selection for CRT: Role of Infarction and Scar," Heart Rhythm Society 30th Annual Scientific Session, Boston, MA
- 11/14-18/09 Speaker, "Acute Lead Dislodgments in Patients Undergoing ICD and CRT Implants: A Report from the ACC-NCDR Registry," American Heart Association Annual Scientific Session, Orlando, FL
- 5/12-15/10 Speaker, "HRS Expert Consensus on Perioperative Management of Patients with CIEDs: Post Operative Management," Heart Rhythm Society 31st Annual Scientific Session, Denver, CO
- 10/7-9/10 Speaker, "Sudden Cardiac Death and the Role of ICDs: Do Current Guidelines Apply to the Chinese Population?" Chinese American Medical Association 15th Biennial Scientific Session, Los Angeles, CA
- 11/14-17/10 Speaker, "The Use of Electrophysiology Studies in the Post-AVID and Post-SCD-HeFT Era: Data from the NCDR ICD Registry," American Heart Association Annual Scientific Session, Chicago, IL
- 4/13-17/11 Speaker, "Evolution in Cardiac Pacing: Old and New Modalities," International Society for Computerized Electrocardiology 36th Annual Conference, San Jose, CA
- 5/3-7/11 Speaker, "Gender Differences in CRT Response: Insights from the SMART-AV Clinical Trial," Heart Rhythm Society 32nd Annual Scientific Session, San Francisco, CA
- 5/3-7/11 Speaker, "Normalization of the LVEF After CRT: Can I Downgrade My CRT-D at the Time of Replacement?" Heart Rhythm Society 32nd Annual Scientific Session, San Francisco, CA
- 11/13-16/11 Speaker, "American Board of Internal Medicine Electrophysiology Maintenance of Certification," American Heart Association Annual Scientific Session, Orlando, FL
- 10/12-13/12 Speaker, "ICDs: Are They Saving Lives?" University of Pennsylvania 2012 Update in Medicine, Atlantic City, NJ

- 10/12-13/12 Speaker, "2012 Update on Management of Atrial Fibrillation," University of Pennsylvania 2012 Update in Medicine, Atlantic City, NJ
- 11/6/12 Speaker, "American Board of Internal Medicine Electrophysiology Maintenance of Certification," American Heart Association Annual Scientific Session, Los Angeles, CA
- 5/8-11/13 Speaker, "Rationale for Simulators in EP Training," Heart Rhythm Society 34th Annual Scientific Session, Denver, CO
- 9/19-20/13 Speaker, "Heart Rhythm Society Board Review ABIM Workshop," Heart Rhythm Society Board Review Course, Chicago, IL
- 10/10/13 Speaker, "Are ICDs and CRTs Changing Patient Outcomes?" Dilemmas in Cardiovascular Medicine, Washington, DC
- 11/17-19/13 Speaker, "American Board of Internal Medicine Electrophysiology Maintenance of Certification," American Heart Association Annual Scientific Session, Dallas, TX
- 9/18-20/14 Speaker, "Heart Rhythm Society Board Review ABIM Workshop," Heart Rhythm Society Board Review Course, Chicago, IL
- 11/14-18/14 Speaker, "American Board of Internal Medicine Electrophysiology Maintenance of Certification," American Heart Association Annual Scientific Session, Chicago, IL
- 1/24/15 Speaker, "Technical Considerations Prior to CRT Implantation: Quadripolar LV Lead, AdaptivCRT or Something Else?" 15th Annual New Frontiers in Heart Failure Therapy, New York, NY
- 5/13-16/15 Speaker, "Debate: CRT-P Upgrade at Time of Generator Replacement for AV Block and EF 40%," Heart Rhythm Society 36th Annual Scientific Session, Boston, MA
- 8/19/15 Speaker, "ABIM Cardiac Electrophysiology Board Review," Heart Rhythm Society Board Review Course, Chicago, IL

International

- 4/17/14 Speaker, "Primary Prevention ICDs in Systolic Heart Failure: New Concepts and Insights," Asian Pacific Congress of Heart Failure Annual Scientific Sessions, Bali, Indonesia
- 11/30-12/3/17 Speaker, "Does Device-Detected AF Cause Strokes?" Cardiological Society of India (CSI) 69th Annual Conference, Kolkata, India
- 1/25-27/18 Speaker/Moderator, "Transforming Care in Sudden Cardiac Death and Severe Aortic Stenosis," AsiaPCR Annual Scientific Meeting, Suntech City, Singapore

Workshops/Seminars

JHMI/Regional

- 6/8/06 Speaker, "EP101: Basics of SVT Ablation," Boston Scientific Educational Seminar Series, Baltimore, MD
- 9/28/06 Speaker, "The ABCs of SCD, ICD and CRT," Medtronic Physician Educational Dinner Series, Baltimore, MD
- 11/27/06 Speaker, "The Nuts and Bolts of ICDs and DFTs," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 12/4/06 Speaker, "Sudden Death and the ICD," Medtronic Physician Educational Dinner Series, Baltimore, MD
- 12/14/06 Speaker, "The ABCs of SCD and ICDs," Guidant Physician Educational Seminars, Cumberland, MD
- 1/8/07 Speaker, "Looking Under the Hood: ICD Lead and Generator Design," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 12/6/07 Speaker, "AVRT and AVNRT: Ablation Strategies," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD

- 5/5/08 Speaker, "Introduction to ICDs," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 10/27/08 Speaker, "Introduction to Intracardiac Electrograms," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 11/13/08 Speaker, "AVRT: Ablation Strategies," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 2/5/09 Speaker, "AVNRT Ablation Strategies," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 2/10/09 Speaker, "Controversies Surrounding CRT Optimization," St. Jude Medical Regional Field Clinical Engineers Quarterly Training Meeting, Baltimore, MD
- 3/3/09 Speaker, "CRT Optimization," Boston Scientific Technology Educational Seminar, Baltimore, MD
- 3/18-19/09 Speaker, "The Alphabet Soup of Sudden Death," 20th Annual Critical Care Nursing Symposium, Baltimore, MD
- 9/9/09 Speaker, "Unknown Device-based Tracings," Medtronic Physician Educational Dinner Series, Baltimore, MD
- 10/29/09 Speaker, "AVNRT Ablation Strategies," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 11/2/09 Speaker, "Introduction to Intracardiac Electrograms," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 12/10/09 Speaker, "Management of Pacers and ICDs for Non-Cardiac Procedures," Cardiac Anesthesia Morning Conference, Baltimore, MD
- 1/7/10 Speaker, "AVRT: Ablation Strategies—2010 Update," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 5/27/10 Speaker, "Sudden Cardiac Death and ICDs," Good Samaritan Housestaff Lecture Series, Baltimore, MD
- 12/9/10 Speaker, "AVNRT: Ablation Strategies—2010 Update," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 1/6/11 Speaker, "Update on Ablation Strategies for AVRT," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 5/10/11 Speaker, "Interpreting ICD Tracings," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 6/30/11 Speaker, "Perioperative Management of ICDs for Non-cardiac Procedures," Cardiac Anesthesia Morning Conference, Baltimore, MD
- 10/18/11 Speaker, "2011 Update on ICDs," Cardiology Fellows ECG Noon Conference Series, Baltimore, MD
- 12/8/11 Speaker, "Update on AVNRT Ablation," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 2/9/12 Speaker, "Update on AVRT Ablation," Cardiac Electrophysiology Fellows Core Lecture Series, Baltimore, MD
- 9/26-27/14 Speaker, "Interpretation of Device Algorithms and Electrograms to Provide Better Patient Treatment Options and Improved Outcomes," St. Jude Medical Transition to Practice Program, Baltimore, MD
- National*
- 8/16/07 Speaker, "CRT Implants: Challenges and Tactics," Boston Scientific Institute for Advanced Medicine, Minneapolis, MN
- 4/12/08 Speaker, "Case Study on Ventricular Arrhythmias in Cardiac Sarcoidosis," Medtronic Emerging Leaders Educational Seminar, Atlanta, GA

- 4/24/08 Speaker, "CRT Implants: Challenges and Tactics," Boston Scientific Institute for Advanced Medicine, Minneapolis, MN
- 7/8/08 Speaker, "2008 ACC/AHA/HRS Update on Device Implantation Guidelines," Medtronic Physician Educational Dinner Series, Lewes, DE
- 9/18/08 Speaker, "Optimizing Cardiac Resynchronization Therapy: From Your Hands to Your Fingertips," Boston Scientific Institute for Advanced Medicine, Minneapolis, MN
- 2/28/09 Speaker, "Ventricular Arrhythmias in the Setting of Cardiac Sarcoidosis," Medtronic Emerging Leaders Physician Seminar, New York, NY
- 10/2/09 Speaker, "Device-based EGMs: Unknown," Boston Scientific Institute for Advanced Medicine, Minneapolis, MN
- 2/12/10 Speaker, "EP Studies Prior to ICD Implantation," Biotronik Technology Physician Educational Seminar, Miami, FL
- 5/22/10 Speaker, "Managing Atrial Fibrillation in 2010," St. Jude Medical Regional Fellows Program, Philadelphia, PA
- 6/3-6/10 Speaker, "Basics in Interpretation of Intracardiac Electrograms—Supraventricular Tachycardias," Boston Scientific EP101 Fellows Program, Boston, MA
- 6/3-6/10 Speaker, "Basic Interpretation of Device-based Electrograms," Boston Scientific EP101 Fellows Program, Boston, MA
- 6/9/10 Speaker, "Managing Atrial Fibrillation in 2010," Medtronic Physician Educational Dinner Series, Lewes, DE
- 8/2/10 Speaker, "2010 Update on the Clinical Management of Atrial Fibrillation," Gilead Pharmaceuticals Physician Lecture Series, San Francisco, CA
- 8/21/10 Speaker, "Sudden Cardiac Death and ICDs: Identifying the Right Patient," Boston Scientific Medical Education Seminar Series, Asheville, NC
- 9/12-13/10 Speaker, "AVNRT: Diagnosis and Ablation Strategies," St. Jude Medical Mid-Atlantic Regional Symposium, Philadelphia, PA
- 5/21/11 Speaker, "Rhythm Identification in Complex Electrocardiograms," Boston Scientific Medical Education Seminar Series, Washington, DC
- 6/3-6/11 Speaker, "Unique Forms of Ventricular Tachycardia," Boston Scientific EP101 Fellows Program, Boston, MA
- 7/23/11 Speaker, "Case Study in Arrhythmogenic Right Ventricular Dysplasia," Organized Approach to Complex Cases, Medtronic Fellows Educational Series, Chicago, IL
- 11/19-20/11 Speaker, "Downgrading CRT-Ds in the Setting of A Normalized EF," Boston Scientific Medical Education Seminar Series, New York, NY
- 9/11/11 Speaker, "Basics of Atrial Arrhythmia Management," St. Jude Medical Mid-Atlantic Regional Symposium, Philadelphia, PA
- 10/18-20/12 Speaker, "Update on CRT and ICD Indications," Boston Scientific Hawaii Meeting, Kauai, HI
- 12/1/12 Speaker, "Perioperative Management of CIEDs," Boston Scientific Professional Education Seminars, San Diego, CA
- 2/5/13 Speaker, "Primary Prevention ICDs: Are They Really Saving Lives?" University of Utah CARMA Research Seminar, Salt Lake City, UT
- 5/18/13 Speaker, "EP Fellows Update," St. Jude Medical Education Series, Washington, DC
- 6/1/13 Speaker, "Ventricular Tachycardia and Entrainment," Boston Scientific EP101 Fellows Program, Boston, MA
- 9/7/13 Speaker, "Device-based Algorithms and the ECG," St. Jude Fellows Education Seminar, Newport, RI
- 9/28/13 Speaker, "Case-Based Discussions," Boston Scientific CRM Educational Seminar, Washington, DC
- 10/26/13 Speaker, "Managing the CRT Non-Responder," Boston Scientific CRM Educational Seminar, New York, NY

- 11/1/13 Speaker, “Biophysics of Catheter-based Ablation,” St. Jude Medical Fellows Education, Austin, TX
- 3/9/14 Speaker, “Diagnosis and Ablation of SVTs,” St. Jude Medical Fellows Education, Washington, DC
- 3/20/14 Speaker, “Deciphering Unknown ECGs,” St. Jude Medical Fellows Education, Los Angeles, CA
- 5/31/14 Speaker, “Idiopathic Forms of Ventricular Tachycardia,” Boston Scientific EP101 Fellows Program, Boston, MA
- 8/21-22/14 Speaker, “Entrainment of Supraventricular Tachycardias,” St. Jude Medical EP301 Fellows Program, Chicago, IL
- 11/21-22/14 Panelist, Emerging Leaders Program, Medtronic Early Career Educational Series, New York, NY
- 4/11/15 Speaker, “Does MADIT RIT Teach Us How to Program ICDs?” St. Jude Medical Fellows Educational Program, New York, NY
- 6/6/15 Speaker, “Wide Complex Tachycardias,” Boston Scientific EP101 Fellows Program, Chicago, IL
- 10/15/15 Speaker, “EP Fellows Jeopardy,” St. Jude Medical Fellows Education Program, Los Angeles, CA
- 12/12/15 Speaker, “Does AF Really Cause Strokes?” St. Jude Medical Fellows Education Program, Washington, DC

International

- 9/23/09 Speaker, “Atrial Arrhythmias: Diagnosis and Management Strategies,” Trinidad and Tobago Health Sciences Initiative Wednesday Evening Lecture Series, Port of Spain, Trinidad
- 3/10/10 Speaker, “Pharmacology and Arrhythmias,” Trinidad and Tobago Health Sciences Initiative Wednesday Evening Lecture Series, Port of Spain, Trinidad
- 3/12/10 Speaker, “Cardiac Anatomy for the Electrophysiologist,” Trinidad and Tobago Health Sciences Initiative Cardiology Fellows Lecture Series, Port of Spain, Trinidad
- 10/20/10 Speaker, “2010 Update on the Clinical Management of Atrial Fibrillation,” Trinidad and Tobago Health Sciences Initiative Wednesday Evening Lecture Series, Port of Spain, Trinidad
- 10/22/10 Speaker, “Management of Atrial Flutter,” Trinidad and Tobago Health Sciences Initiative Cardiology Fellows Lecture Series, Port of Spain, Trinidad
- 11/10/10 Speaker, “Introduction and Troubleshooting Intracardiac Electrograms,” Trinidad and Tobago Health Sciences Initiative Wednesday Evening Lecture Series, Port of Spain, Trinidad
- 1/25/13 Speaker, “ICD Lead Management,” St. Jude Medical Education Series, Hamilton, Bermuda

Mentoring

Pre-doctoral Advisees/Mentees

- 2010–2011 Shueh H. Lim, MBBS, [medical student], currently Attending Surgeon at NHS Greater Glasgow and Clyde, Glasgow, UK. Co-authored an abstract [Lim SH](#), Fasoro Y, Dong J, Spragg DD, Nazarian S, Calkins H, Berger RD, Tomaselli GF, Thiemann D, **Cheng A**. Clinical and Electrophysiological Characteristics of Slow Atrioventricular Nodal Reentrant Tachycardias that was presented 2012 at the World Congress of Cardiology in Dubai, UAE.

Post-doctoral Advisees/Mentees (Research Advisees Only—Clinical Advisees Omitted)

- 2007-2008 Kenneth C. Bilchick, MD, [cardiac electrophysiology fellow], currently Associate Professor of Medicine, University of Virginia, Charlottesville, VA. Co-authored Bilchick KC, Stukenborg G, Kamath S, **Cheng A**. Prediction of Mortality in Clinical Practice for Patients Undergoing Defibrillators for Primary Prevention of Sudden Cardiac Death, *J Am Coll Cardiol* 2012;60(17):1647-55; Bilchick KC, Wang Y, **Cheng A**, Curtis JP, Dharmarajan K, Stukenborg GJ, Shadman R, Anand I, Lund LH, Dahlstrom U, Sartipy U, Maggioni A, Swedberg K, O’Conner C, Levy WC. Seattle Heart Failure and Proportional Risk Models Predict Benefit From Implantable Cardioverter Defibrillators. *J Am Coll Cardiol* 2017; 69(21):2606-18; and an abstract **Bilchick KC**, Stukenborg G, Kamath S, DiMarco JP, **Cheng A**. Prognostic Impact of Electrophysiology Study Results in Medicare Beneficiaries Receiving Implantable Cardioverter Defibrillators for Primary and Secondary Prevention of Sudden Cardiac Death presented at the Heart Rhythm Society Annual Scientific Sessions in May 2007.
- 2007-2009 Daniel Scherr, MD, [cardiac electrophysiology research fellow], currently Associate Professor of Medicine, Medical University of Graz, Austria. Co-authored Scherr D, Dalal D, Henrikson CA, Spragg DD, Berger RD, Calkins H, **Cheng A**. Prospective Comparison of the Diagnostic Utility of a Standard Event Monitor versus a “Leadless” Portable ECG Monitor in the Evaluation of Patients with Palpitations. *J Interv Card Electrophysiol* 2008; 22(1):39-44.
- 2009-2011 Robert Kennedy, MD, [cardiology postdoctoral fellow], currently private practice cardiac electrophysiologist, Traverse City, MI. Co-authored an abstract Kennedy R, Zhang Y, Gafoor S, Mehdi M, Singh B, Dalal D, Butcher B, Shah MH, Bukata E, Marine JE, Spragg DD, Sinha SK, Berger RD, Calkins H, Weiss RG, Guallar E, Tomaselli GF, **Cheng A**. Racial Differences in Primary Prevention ICD Therapy: Findings from the PROSE-ICD Study. *J Am Coll Cardiol* 2010; 55:A14.E138 that was presented at the American College of Cardiology Scientific Sessions in 2010.
- 2010-2011 Chete Eze-Nliam, MD, MPH, [postdoctoral research fellow], currently cardiologist at The Cleveland Clinic. Co-authored an abstract Eze-Nliam CM, Dalal D, Zhang Y, Tereshchenko LG, Butcher B, Marine JE, Spragg DD, Berger RD, Calkins H, Weiss RG, Guallar E, Tomaselli GF, **Cheng A**. Inflammatory and myocardial biomarkers and their relationship to inducibility of ventricular tachyarrhythmias that was presented at the 2011 Heart Rhythm Society Annual Scientific Sessions.
- 2010-2012 Matthew Needleman, MD, [cardiac electrophysiology fellow], currently cardiac electrophysiology at Bethesda Naval Hospital, Bethesda, MD. Co-authored Needleman M, Berger RD, **Cheng A**. Inhibition of tachytherapy during ventricular tachycardia in a patient with a functioning dual-chamber ICD: What is the mechanism? *Heart Rhythm* 2012; 9(3):467-9.
- 2010-2013 Bharat Singh, MBBS, MD, [internal medicine resident], currently Instructor of Medicine, Johns Hopkins Hospital. Co-authored Singh B, Russell SD, **Cheng A**. Update on device technologies for monitoring heart failure. *Curr Treat Options Cardiovasc Med* 2012; 14(5):536-49.
- 2013-2016 Victor Nauffal, MD, [postdoctoral research fellow], currently third year medicine resident, Johns Hopkins Hospital, awarded the Johns Hopkins Murex Research Fellowship Award and a Finalist in the American Heart Association Young Investigators Competition. Co-authored Nauffal V, Zhang Y, Tanawuttiwat T, Blasco-Colmenares E, Rickard J, Marine JE, Butcher B, Norgard S, Dickfeld TM, Ellenbogen KA, Guallar E, Tomaselli GF, **Cheng A**. Clinical decision tool for CRT-P vs. CRT-D implantation: Findings from the PROSE-ICD. *PLoS One* 2017; 12(4):e0175205; Nauffal V, Zhang Y, Blasco-Colmenares E, Spragg DD, Marine JE, Butcher B, Norgard S, Guallar E, Tomaselli GF, **Cheng A**. Baseline troponin T levels modulate the effects of ICD shocks on all-cause mortality. *J Am Coll Cardiol* 2015; 66(25):2911-2; and Nauffal V,

Tanawuttiwat I, Zhang Y, Rickard J, Marine JE, Butcher B, Norgard S, Dickfeld T, Ellenbogen KA, Guallar E, Tomaselli GF, **Cheng A.** *Heart Rhythm* 2015; 12(12):2387-94.

2013-present Tanyanan Tanawuttiwat, MD, [cardiac electrophysiology fellow], currently Assistant Professor of Medicine, University of Mississippi, Jackson, MS. Co-authored Tanawuttiwat T, Cheng A. Which Patients with AV Block Should Receive CRT Pacing? *Curr Treat Options Cardiovasc Med* 2014;16(3):291.

Thesis Committees

2011 Yiyi Zhang, PhD, Epidemiology, "QT Interval Duration and Sudden Cardiac Death," committee member

2012 Seth H. Weinberg, PhD, Biomedical Engineering, "High Frequency Field Myocardial Defibrillation," committee member.

Educational Program Building/Leadership

2008-2016 Electrophysiology Training in Device Management. I established a high-throughput device clinic for educating electrophysiology postdoctoral fellows on the basics of pacemaker and implantable cardioverter defibrillator device management. I also compiled a "Tracing of the Week" program where electrophysiology postdoctoral fellows are provided an opportunity to review and interpret unknown device-based tracings weekly.

Educational Demonstration Activities to External Audiences

None.

RESEARCH ACTIVITIES

Research Focus (Biosketch Section A): I currently serve as Vice President of Cardiac Rhythm Management Clinical Research and Therapy Development at Medtronic and as an Adjunct Associate Professor of Medicine and Pediatrics at the Johns Hopkins University School of Medicine. I have extensive experience in the clinical management of patients with arrhythmias and understand well the current limitations of existing diagnostic tools in the evaluation and management of these conditions. More specifically, my research has focused on risk stratification for sudden cardiac death and atrial fibrillation. The context in which I investigate these issues have involved small cohort studies (n~1000 patients) as well as large population-based datasets using both industry-based resources as well as governmental administrative databases. I have also participated in big data analysis and single center studies on atrial fibrillation using insurance claims and electronic health records.

Research Program Building/Leadership

None.

Research Demonstration Activities

None.

Inventions, Patents, Copyrights

8/11/2015 Automatic External Defibrillator for Implantable Cardiac Defibrillator Patients Undergoing Procedures Involving Electromagnetic Interference
US 9,101,780 B2

9/22/2016 TASS: Transseptal Access Stability System for Percutaneous Interventions
US 2016/0270837 A1

11/21/16 Sensing Refinement for Extravascular ICD Systems
Pending

Technology Transfer Activities
None.

SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

System Innovation Focus: My efforts have focused around reducing complications for patients with cardiac implantable electronic devices both as well as identifying ways in which to scale up delivery of electrophysiologic care to patients by leveraging physician extenders in assisting with basic electrophysiologic procedures.

System Innovation and Quality Improvement Efforts within JHMI

2009-2016 Management of Pacemakers, Defibrillators and Cardiac Resynchronization Therapy Devices in the Perioperative Period

Role: I developed the protocol and worked collaboratively with anesthesia and surgery to implement the current practice model.

Percent Effort: 10%

Venue: Johns Hopkins Hospital

Description: I developed a comprehensive protocol for the management of patients with cardiac implantable devices in all non-cardiac surgical procedures. I developed individual protocols for patients undergoing endoscopy, non-cardiac surgery as well as cardiac surgery. I presented at various grand rounds and faculty meetings for many surgical specialty groups in an effort to raise awareness of the importance of properly managing patient devices at the time of surgery. I also collaboratively worked with Department heads of surgery, anesthesiology and nursing. We have presented our protocol to the Johns Hopkins Hospital Patient Safety Committee and the Management Committee of the Vice Presidents for Johns Hopkins Hospital.

Result: Established an approved addition to the Johns Hopkins Hospital Surgical Nursing Clinical Practice Manual (Policy Number PACUC011, approved 09-28-2011). As a result of this protocol, Patient Safety Net reports have significantly dropped since 2006 (11 to 3).

2010-2016 Certification of Cardiovascular Radiation Technologists in the Performance of Venous Access and Device Implantation for Electrophysiologic Procedures

Role: I served as the Physician Champion and developed the protocol for training.

Percent Effort: 10%

Venue: Johns Hopkins Hospital

Description: As we anticipate expanding our services to the New Clinical Building, a shortage of procedural assistants in the electrophysiology laboratories was realized. I championed an effort to train our current cardiovascular radiation technologists in the performance of certain procedures including venous access for electrophysiology studies and the surgical incisions for pacemakers and defibrillator implantations. I worked collaboratively with the Chief Electrophysiologist Radiation Technologist in developing a comprehensive certification protocol that will certify and oversee this program.

Result: As a result of my efforts, we have significantly made available a larger pool of assistants for electrophysiology procedures and are well positioned to take upon the increased demand for staffing when we transition to the New Clinical Building.

System Innovation and Quality Improvement Efforts Outside of JHMI

None.

System Innovation and Quality Improvement Program Building/Leadership
None.

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

2007-2008 Director, Pacing and ICD Service. Johns Hopkins Bayview Medical Center
 2007-2008 Physician Champion, PaceArt Electronic Device Management System. Johns Hopkins Bayview Medical Center
 2008-2016 Director, Arrhythmia Device Service. Johns Hopkins Hospital
 2010-2016 Director, Cardiac Sarcoidosis Clinic. Johns Hopkins Hospital
 2011-2016 Physician Champion, Certification of Cardiovascular Radiation Technologists in the Performance of Venous Access and Device Implantation for Electrophysiologic Procedures
 2014-2016 Physician Champion, Epic Cupid Launch, Johns Hopkins Hospital

Editorial Activities

Editorial Board Appointments

2007-2011 Member, Editorial Board, Journal of Cardiac Failure
 2013-2016 Section Editor (Cardiology), UpToDate
 2014-2016 Section Editor (Arrhythmogenic Right Ventricular Cardiomyopathy), UpToDate
 2015-2016 Section Editor (EP Boards Challenge), Arrhythmia Grand Rounds

Journal Peer Review Activities

2006-present Journal of Cardiovascular Electrophysiology
 2006-present Journal of Cardiac Failure
 2007-present Journal of the American College of Cardiology
 2007-present Heart Rhythm
 2007-present Pacing and Clinical Electrophysiology
 2007-present Journal of Interventional Cardiovascular Electrophysiology
 2008-present American Journal of Cardiology
 2009-present Anesthesia and Analgesia
 2009-present Journal of Hospital Medicine
 2009-present Circulation: Arrhythmia and Electrophysiology
 2011-present Medicine
 2014-present Annals of Internal Medicine
 2014-present Journal of Cardiovascular Translational Research
 2014-present International Journal of Cardiovascular Research
 2014-present Contemporary Clinical Trials
 2014-2016 Arthritis and Rheumatism
 2014-present Digestive Diseases and Science
 2015-present Europace
 2015-present Journal of Cardiovascular Medicine
 2015-present American Heart Journal
 2015-present Heart Rhythm Case Reports
 2016-present American Family Physician

Other Peer Review Activities

None.

Advisory Committees, Review Groups/Study Sections

- 2011-2016 Reviewer, Veteran Affairs Administration Cooperative Study Section Reviews
 2015 Reviewer, NIH R13 Conference Grant Awards
 2015-2016 Reviewer, American Heart Association Bioengineering and Cardiac Electrophysiology Clinical Grant Review Committee

Professional Societies

- 1993-1998 Member, American Medical Association
 1995-2007 Member, American College of Physicians
 2001-present American College of Cardiology
 2001-present Member
 2005-2007 Fellow in Training Member, Building Committee
 2009-present Fellow
 2009-2015 Member, Credentialing and Member Services Committee
 2004-present American Heart Association
 2004-present Member
 2010-present Fellow
 2007-present Heart Rhythm Society
 2007-present Member
 2011-present Fellow
 2008 – 2012 Member, Education Committee.
 2014-2016 Member, Scientific Sessions Committee
 2014-present European Society of Cardiology
 2014-present Member
 2014-present Fellow
 2017-present Member, Asia Pacific Heart Rhythm Society

Conference Organizer

JHMI/Regional

- 9/18-19/10 Conference Organizer/Chair, Biotronik Fellows Training Program, Annapolis, MD

National

- 3/3-7/11 Chair, Perioperative Management of Patients with Implantable Defibrillators, Pacemakers and Arrhythmia Monitors, Heart Rhythm Society 32nd Annual Scientific Session, San Francisco, CA
 5/17-19/12 Conference Organizer/Chair, St. Jude Medical Basics of Cardiac Anatomy for the EP Fellow, Austin, TX
 7/24-27/12 Chair, EP 201: Transitioning from Training to Practice, Boston Scientific Fellows Educational Program, Chicago, IL
 4/13-14/13 Conference Organizer/Chair, St. Jude Medical EP Fellows Program, Austin, TX
 5/8-11, 2013 Chair, Managing Anticoagulation and Antiplatelet Agents at Time of PPM and ICD Procedures, Heart Rhythm Society 34th Annual Scientific Session, Denver, CO
 4/11-13/14 Conference Organizer/Chair, EP Procedural Program, St. Jude Medical, Austin, TX
 5/7-10/14 Chair, "Placing a Coronary Sinus Lead," Heart Rhythm Society 35th Annual Scientific Session, San Francisco, CA
 5/7-10/14 Chair, "EP Boot Camp: Device Tracings," Heart Rhythm Society 35th Annual Scientific Session, San Francisco, CA
 5/13-16/15 Chair, "Complication Theater," Heart Rhythm Society 36th Annual Scientific Sessions, Boston, MA

- 5/13-16/15 Chair, "Abstract Session on Device Infections," Heart Rhythm Society 36th Annual Scientific Sessions, Boston, MA
- 9/25-27/15 Chair, "CVG Cardiovascular Program," Medtronic Professional Education Series, Honolulu, HI

International

None.

Consultantships

- 2009-2016 Advisor/Consultant, Medtronic, Inc. (Mounds View, MN)
- 2009-2013 Advisor/Consultant, Boston Scientific Corporation (St. Paul, MN)
- 2009-2013 Advisor/Consultant, St. Jude Medical Corporation (Sylmar, CA)
- 2010-2013 Advisor/Consultant, BIOTRONIK, Inc. (Berlin, Germany)

RECOGNITION

Awards, Honors

- 1990 Nominated and Inducted into the Alpha Lambda Delta (ΑΛΔ) and the Phi Eta Sigma (ΦΗΣ) Freshman Honor Societies at UCLA (based on scholastic achievement in the first year of undergraduate studies)
- 1991 Awarded the Geismann Organic Chemistry Award (presented to one undergraduate per year for outstanding performance in organic chemistry)
- 1993 Awarded the Dunn Prize in Biochemistry at UCLA (presented to one undergraduate student at graduation for overall outstanding performance in the Department of Biochemistry)
- 1993 Graduated with Highest Honors in biochemistry at UCLA (presented to top 1% of graduating class)
- 1993 Nominated and Inducted into the Phi Beta Kappa (ΦBK) Honor Society at UCLA
- 1993 *Summa cum laude* in Biochemistry at UCLA
- 1994 Awarded a Summer Student Research Fellowship from Yale Medical School, Office of Student Research
- 1996 Awarded a Fellowship at the Howard Hughes Medical Institute-National Institutes of Health Research Scholars Program for the 1996-97 Academic Year (Awarded to 43 students nationwide annually)
- 1997 Awarded the Howard Hughes Medical Institute Medical Student Fellowship Award for promise in biomedical research (Awarded to 10 students annually)
- 1997 Awarded the American College of Rheumatology Annual Medical Student Achievement Award for outstanding research in rheumatology (5 awards annually)
- 1997 Winning abstract in the National Institutes of Health-American Association of Medical Colleges (NIH-AAMC) annual abstract competition in basic science research (40 abstracts selected nationwide annually)
- 1998 Farr Scholar of the Yale University School of Medicine.
- 1998 Awarded the William U. Gardner Prize for the Most Outstanding Thesis in the Yale Medical School Graduating Class (1 award annually)
- 2000 Winning Poster in the American College of Physicians-American Society of Internal Medicine Annual Associates Clinical Vignette Poster Competition (10 awards annually)
- 2000 Awarded the Travel Trainee Award for the 2000 American Society for Clinical Investigation (ASCI)-Association of American Physicians Annual Joint Meeting.
- 2002 Merck Fellow of the American College of Cardiology (6 awards annually)
- 2005-6 Chief Fellow, Section for Cardiac Electrophysiology, Division of Cardiovascular Diseases, Department of Medicine, Johns Hopkins Hospital. Baltimore, MD.

2014 Winner, BioMaryland Center Biotechnology Development Award

Invited Talks

JHMI/Regional

Please see above.

National

Please see above.

International

Please see above.

Visiting Professorships

None.

OTHER PROFESSIONAL ACCOMPLISHMENTS

Posters (since 2017)

- 8/26-30/17 **Cheng A**, Auricchio A, Schloss EJ, Sterns LD, Kurita T, Meijer A, Gerritse B, Brown M, Ellenbogen KA. SVT discrimination algorithms significantly reduce the rates of inappropriate therapies in the setting of modern day delayed high-rate detection programming.” European Society of Cardiology Annual Congress, Barcelona, Spain
- 11/11-15/17 Olshansky B, Atteya G, Cannom D, Heidebuchel H, Saarel E, Anfinson OG, **Cheng A**, Gold MR, Mussigbrodt A, Patton K, Saxon L, Wilkoff B, Willems R, Lampert R. “Competitive athletes with implantable cardioverter defibrillators—How to program? Data from the ICD sports registry.” American Heart Association Annual Scientific Sessions, Anaheim, CA
- 5/9-12/18 **Cheng A**, Joung BY, Brown ML, Koehler J, Lexcen DR, Sanders P, Ellenbogen KA. “Characteristics of ventricular tachyarrhythmias and their susceptibility to ATP termination in patients with ischemic and nonischemic cardiomyopathy: a meta-analysis of 3 large clinical trials.” Heart Rhythm Society Annual Scientific Sessions, Boston, MA
- 10/16-19/18 Liu XB, Su YG, Zhang ZH, Huang DJ, Xu YN, Jian LY, Cheng XY, Fei F, Wang XY, Sun WF, Liu SF, **Cheng A**. “Safety and Effectiveness of the Evera MRI ICD System in China.” Asia-Pacific Heart Rhythm Society Annual Scientific Sessions, Taipei, Taiwan
- 10/16-19/18 Joung BY, Lexcen DR, Ching CK, Silver M, Piccini JP, Sterns L, Rabinovich R, Pickett R, Liu SF, Brown M, **Cheng A**. Antitachycardia pacing (ATP) programming strategies further reduce unnecessary implantable cardioverter defibrillator (ICD) shocks.” Asia-Pacific Heart Rhythm Society Annual Scientific Sessions, Taipei, Taiwan
- 11/10-12/18 Tanawuttiwat T, Lande J, Smeets P, Shanahan L, Gerritse B, Nazarian S, Guallar E, **Cheng A**. Short and long term association of atrial fibrillation burden with heart failure events in patients with cardiac resynchronization therapy devices. American Heart Association Scientific Sessions, Chicago, IL
- 05/09-11/19 Cheung JW, Bennett M, Lexcen DL, Abeyratne AI, Taepke RT, Brown ML, **Cheng A**. Impact of emerging clinical evidence and changes in default settings on real world trends in implantable cardioverter defibrillator programming between 2008-2015. Heart Rhythm Society Scientific Sessions, San Francisco, CA
- 10/22-25/19 **Cheng A**, Schaber D, Manrodt C, Fonarow GC, Curtis AB. Utilization of guideline-directed device therapies in heart failure patients: a real-world analysis using electronic health record data. Asia-Pacific Heart Rhythm Society Scientific Sessions. Bangkok, Thailand

- 10/22-25/19 **Cheng A**, Schaber D, Manrodt C, Fonarow GC, Curtis AB. Electrophysiologist visits among a real-world cohort of guideline-indicated patients: implications for ICD use. Asia-Pacific Heart Rhythm Society Scientific Sessions. Bangkok, Thailand
- 10/22-25/19 **Cheng A**, Schaber D, Manrodt C, Fonarow GC, Curtis AB. Real-world assessment of disparities in the use of guideline-directed defibrillator therapy. Asia-Pacific Heart Rhythm Society Scientific Sessions. Bangkok, Thailand

Oral/Podium Presentations

- 10/22-25/19 **Cheng A**, Narasimhan C, Malik FTN, Sethi R, Afroz N, Reynolds DW, Kothari Y, Reddy V, Rajan V, Bergemann T, Pandurangi UM, Khan KN, Naik A. Practice-specific process improvement interventions in diagnosis and adoption of pacemaker therapy in sinus-node dysfunction patients: results from the Improve Brady clinical study. Asia-Pacific Heart Rhythm Society Scientific Sessions. Bangkok, Thailand

Philanthropic Activities