




Norman H. Silverman

Honorary Faculty Emeritus, Pediatrics

 NIH Biosketch available Online

 Curriculum Vitae available Online

Bio

ACADEMIC APPOINTMENTS

- Honorary Faculty Emeritus, Pediatrics
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Professor of Pediatrics (Cardiology), Stanford University Medical Center, (2002- present)
- Professor of Radiology in Residence, University of California, San Francisco, (1985-2002)
- Associate Professor of Pediatrics, University of California, San Francisco, (1979-1985)
- Assistant Professor of Pediatrics, University of California, San Francisco, (1975-1982)
- Assistant Professor of Pediatrics, Stanford University Medical Center, (1974-1975)

HONORS AND AWARDS

- Janet Baldwin Lecture, Society of Pediatric Cardiology of New York (1999)
- Founder's Award, American Society of Echocardiography (2000)
- Sackler Visiting Fellow, University of Tel Aviv Israel (2001, 2004)
- 23rd Annual Katkov-Lundeen Visiting Professorship in Pediatric Cardiology, Minneapolis Children's Hospital (2004)
- 13th Jerome Liebman Visiting Professor, Case Western Reserve University, Cleveland, OH (1996)
- Garbose Lecture, Children's National Medical Center, Washington DC (1999)
- Fellow, American Heart Association (2004)
- Fellow, American Society of Echocardiography (2004)
- Award for Excellence in Teaching, American Society of Echocardiography (2008)
- Roma and Marvin Auerback Scholar in Pediatric Cardiology, Lucile Packard Children's Hospital, Stanford University (2005-current)

PROFESSIONAL EDUCATION

- D.Sc.Med., University of the Witwatersrand , Medicine (1985)
- F.C.P. (S.A.) F.C.P. (S.A.), South African College of Medicine , Pediatrics (1970)
- M.B., B.Ch., University of the Witwatersrand , Medicine (1966)

COMMUNITY AND INTERNATIONAL WORK

- Children's Heartlink Mumbai, India. 2007, Asian Heart Institute

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research interests center around cardiac ultrasound. I am currently working on several areas in the development of human cardiac ultrasound.

The first is fetal cardiac ultrasound. I have continued to develop and foster research and development in this area. I am associated with the cardiac surgeons and interventional cardiologists to develop a program for fetal cardiac intervention at Stanford.

Secondly, I am currently establishing a program for development of three-dimensional ultrasound to aid conventional echocardiography in diagnosis and management. This program will assess both the prenatal and postnatal capabilities.

CLINICAL TRIALS

- Peripheral Blood Stem Cell Transplant vs Bone Marrow Transplant in Individuals With Hematologic Cancers (BMT CTN 0201), Not Recruiting
- Sirolimus/Tacrolimus Versus Tacrolimus/Methotrexate for Preventing Graft-Versus-Host Disease (GVHD) (BMT CTN 0402), Not Recruiting

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cardiothoracic Surgery (Fellowship Program)

Publications

PUBLICATIONS

- **Postoperative Recovery of Left Ventricular Function following Repair of Large Ventricular Septal Defects in Infants.** *Journal of the American Society of Echocardiography : official publication of the American Society of Echocardiography*
Adamson, G. T., Arunamata, A., Tacy, T. A., Silverman, N. H., Ma, M., Maskatia, S. A., Punn, R.
2019
- **Cardiac Segmental Strain Analysis in Pediatric Left Ventricular Noncompaction Cardiomyopathy** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Arunamata, A., Stringer, J., Balasubramanian, S., Tacy, T. A., Silverman, N. H., Punn, R.
2019; 32 (6): 763-+
- **Cardiac Segmental Strain Analysis in Pediatric Left Ventricular Noncompaction Cardiomyopathy.** *Journal of the American Society of Echocardiography : official publication of the American Society of Echocardiography*
Arunamata, A., Stringer, J., Balasubramanian, S., Tacy, T. A., Silverman, N. H., Punn, R.
2019
- **Aortopulmonary window in tetralogy of fallot with absent conal septum.** *Echocardiography (Mount Kisco, N.Y.)*
Aurigemma, D., Dixon, C., Tucker, S., Davis, C., Silverman, N.
2018
- **THE DEVELOPMENT AND EFFICACY OF A PEDIATRIC CARDIOLOGY FELLOWSHIP ONLINE PREPARATORY COURSE**
Motonaga, K., Sacks, L., Olson, I., Balasubramanian, S., Chen, S., Peng, L., Feinstein, J., Silverman, N., Hanley, F., Axelrod, D., Krawczeski, C., Ceresnak, S.
ELSEVIER SCIENCE INC.2018: 2622
- **Changing Management of the Patent Ductus Arteriosus: Effect on Neonatal Outcomes and Resource Utilization.** *American journal of perinatology*
Chock, V. Y., Goel, V. V., Palma, J. P., Luh, T. M., Wang, N. A., Gaskari, S., Punn, R., Silverman, N. H., Benitz, W. E.
2017
- **Tricuspid Atresia with Non-compaction: An Early Experience with Implications for Surgical Palliation.** *Pediatric cardiology*
Nguyen, H. H., Khan, R., Silverman, N. H., Singh, G. K.

2017; 38 (3): 495–505

- **Assessment of Progressive Pathophysiology After Early Prenatal Diagnosis of the Ebstein Anomaly or Tricuspid Valve Dysplasia** *AMERICAN JOURNAL OF CARDIOLOGY*
Tierney, E. S., McElhinney, D. B., Freud, L. R., Tworetzky, W., Cuneo, B. F., Escobar-Diaz, M. C., Ikemba, C., Kalish, B. T., Komarlu, R., Levasseur, S. M., Puchalski, M. D., Satou, G. M., Silverman, et al
2017; 119 (1): 106-111
- **Assessment of Progressive Pathophysiology After Early Prenatal Diagnosis of the Ebstein Anomaly or Tricuspid Valve Dysplasia.** *American journal of cardiology*
Selamet Tierney, E. S., McElhinney, D. B., Freud, L. R., Tworetzky, W., Cuneo, B. F., Escobar-Diaz, M. C., Ikemba, C., Kalish, B. T., Komarlu, R., Levasseur, S. M., Puchalski, M. D., Satou, G. M., Silverman, et al
2016
- **Decompressing vein and bilateral superior venae cavae in a patient with hypoplastic left heart syndrome.** *Echocardiography (Mount Kisco, N.Y.)*
Stauffer, K. J., Arunamata, A., Vasanawala, S. S., Behera, S. K., Kipps, A. K., Silverman, N. H.
2016; 33 (9): 1428-1431
- **Postnatal Outcome of Fetal Left Ventricular Hypertrabeculation/Noncompaction** *PEDIATRIC CARDIOLOGY*
Stoellberger, C., Wegner, C., Benatar, A., Chin, T. K., Dangel, J., Majoor-Krakauer, D., Mondal, T. K., Sivanandam, S., Silverman, N. H., van Waning, J., Finsterer, J.
2016; 37 (5): 919-924
- **Routine intra-operative trans-oesophageal echocardiography yields better outcomes in surgical repair of CHD.** *Cardiology in the young*
Madriago, E. J., Punn, R., Geeter, N., Silverman, N. H.
2016; 26 (2): 263-268
- **Near-fatal neonatal coronary ischaemia associated with intermittent aortic regurgitation: successful surgical treatment** *CARDIOLOGY IN THE YOUNG*
Likes, M. L., Silverman, N. H., Albers, E. L., Choy, R., Bhat, A., McMullan, D. M.
2015; 25 (8): 1531-1535
- **Echocardiographic presentation of anomalous origin of the left coronary artery from the pulmonary artery** *CARDIOLOGY IN THE YOUNG*
Silverman, N. H.
2015; 25 (8): 1512-1523
- **Echocardiography of congenital mitral valve disorders: echocardiographic-morphological comparisons** *CARDIOLOGY IN THE YOUNG*
Silverman, N. H.
2014; 24 (6): 1030-1048
- **Evaluation of Risk Factors for Prediction of Outcome in Fetal Spectrum of Atrioventricular Septal Defects** *CONGENITAL HEART DISEASE*
Bader, R. S., Punn, R., Silverman, N. H.
2014; 9 (4): 286-293
- **Predictors of bronchopulmonary dysplasia or death in premature infants with a patent ductus arteriosus.** *Pediatric research*
Chock, V. Y., Punn, R., Oza, A., Benitz, W. E., Van Meurs, K. P., Whittemore, A. S., Behzadian, F., Silverman, N. H.
2014; 75 (4): 570-575
- **Transcatheter Device Closure of a Congenital Aortic-Left Atrial Tunnel** *CONGENITAL HEART DISEASE*
Sun, H. Y., Buccola, K. J., Punn, R., Silverman, N. H., Peng, L. F., Perry, S. B., Balasubramanian, S.
2014; 9 (1): E23-E26
- **Transcatheter device closure of a congenital aortic-left atrial tunnel.** *Congenital heart disease*
Sun, H. Y., Buccola, K. J., Punn, R., Silverman, N. H., Peng, L. F., Perry, S. B., Balasubramanian, S.
2014; 9 (1): E23-6
- **The essential echocardiographic features of tetralogy of Fallot** *6th World Congress of Pediatric Cardiology and Cardiac Surgery*
Silverman, N. H.
CAMBRIDGE UNIV PRESS.2013: 871–82
- **Echocardiography of transposition of the great arteries** *CARDIOLOGY IN THE YOUNG*
Mahle, W. T., Gonzalez, J. H., Kreeger, J., Marx, G., Duldani, G., Silverman, N. H.

2012; 22 (6): 664-670

- **Echocardiographic Diagnosis and Prognosis of Fetal Left Ventricular Noncompaction** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Arunamata, A., Pun, R., Cuneo, B., Bharati, S., Silverman, N. H.
2012; 25 (1): 112-120
- **Fetal Predictors of Urgent Balloon Atrial Septostomy in Neonates with Complete Transposition** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Pun, R., Silverman, N. H.
2011; 24 (4): 425-430
- **Aortic and Mitral Valve Stenosis with Regurgitation: Not Due to Rheumatic Heart Disease** *ECHOCARDIOGRAPHY-A JOURNAL OF CARDIOVASCULAR ULTRASOUND AND ALLIED TECHNIQUES*
Talluto, C. J., Silverman, N. H.
2011; 28 (2): E24-E27
- **Anomalous coronary arteries from the opposite sinus of Valsalva in asymptomatic siblings treated with pulmonary arterial translocation** *JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY*
Obayashi, D. Y., Yeh, J., Silverman, N. H., Hanley, F. L.
2010; 140 (6): 1430-1432
- **Echocardiography of the aortopulmonary window, aorto-ventricular tunnels, and aneurysm of the sinuses of Valsalva** *CARDIOLOGY IN THE YOUNG*
Mahle, W. T., Kreeger, J., Silverman, N. H.
2010; 20: 100-106
- **Echocardiographic imaging of anomalous origin of the coronary arteries** *CARDIOLOGY IN THE YOUNG*
Cohen, M. S., Herlong, R. J., Silverman, N. H.
2010; 20: 26-34
- **Surgical management of life threatening events caused by intermittent aortic insufficiency in a native valve: case report** *JOURNAL OF CARDIOTHORACIC SURGERY*
Martin, M. H., Perry, S. B., Prochazka, J. V., Hanley, F. L., Silverman, N. H.
2010; 5
- **A continuous heparin infusion does not prevent catheter-related thrombosis in infants after cardiac surgery** *PEDIATRIC CRITICAL CARE MEDICINE*
Schroeder, A. R., Axelrod, D. M., Silverman, N. H., Rubesova, E., Merkel, E., Roth, S. J.
2010; 11 (4): 489-495
- **Cardiac Segmental Analysis in Left Ventricular Noncompaction: Experience in a Pediatric Population** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Pun, R., Silverman, N. H.
2010; 23 (1): 46-53
- **Screening for Aortic Root Dilation in Marfan Syndrome Using the Ratio of the Aortic Root to Descending Aortic Diameters in Children** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Kemna, M. S., Murphy, D. J., Silverman, N. H.
2009; 22 (10): 1109-1113
- **Doppler Assessment of the Ratio of the Systolic to Diastolic Duration in Normal Children: Relation to Heart Rate, Age and Body Surface Area** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Sarnari, R., Kamal, R. Y., Friedberg, M. K., Silverman, N. H.
2009; 22 (8): 928-932
- **Prenatal Detection of Congenital Heart Disease** *JOURNAL OF PEDIATRICS*
Friedberg, M. K., Silverman, N. H., Moon-Grady, A. J., Tong, E., Nourse, J., Sorenson, B., Lee, J., Hornberger, L. K.
2009; 155 (1): 26-31
- **Anatomy, echocardiography, and surgical approach to double outlet right ventricle** *8th International Symposium on Congenital Heart Disease*
Mahle, W. T., Martinez, R., Silverman, N., Cohen, M. S., Anderson, R. H.
CAMBRIDGE UNIV PRESS.2008: 39-51

- **Morphological studies of pulmonary arteriovenous shunting in a lamb model of superior cavopulmonary anastomosis** *PEDIATRIC CARDIOLOGY*
McMullan, D. M., Reddy, V. M., Gottliebson, W. M., Silverman, N. H., Perry, S. B., Chan, F., Hanley, F. L., Riemer, R. K.
2008; 29 (4): 706-712
- **Idiopathic premature closure of the ductus arteriosus: An indication for early delivery** *ECHOCARDIOGRAPHY-A JOURNAL OF CARDIOVASCULAR ULTRASOUND AND ALLIED TECHNIQUES*
Soslow, J. H., Friedberg, M. K., Silverman, N. H.
2008; 25 (6): 650-652
- **Extension of Doppler-derived echocardiographic measures of pulmonary vascular resistance to patients with moderate or severe pulmonary vascular disease** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Vlahos, A. P., Feinstein, J. A., Schiller, N. B., Silverman, N. H.
2008; 21 (6): 711-714
- **Surgical management of coronary artery arising from the wrong coronary sinus, using standard and novel approaches** *85th Annual Meeting of the American-Association-for-Thoracic-Surgery*
Gulati, R., Reddy, V. M., Culbertson, C., Helton, G., Suleman, S., Reinhartz, O., Silverman, N., Hanley, F. L.
MOSBY-ELSEVIER.2007: 1171-U12
- **Right ventricular mechanical dyssynchrony in children with hypoplastic left heart syndrome** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Friedberg, M. K., Silverman, N. H., Dubin, A. M., Rosenthal, D. N.
2007; 20 (9): 1073-1079
- **The systolic to diastolic duration ratio in children with hypoplastic left heart syndrome: A novel doppler index of right ventricular function** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Friedberg, M. K., Silverman, N. H.
2007; 20 (6): 749-755
- **Mechanical dyssynchrony in children with systolic dysfunction secondary to cardiomyopathy: A Doppler tissue and vector velocity imaging study** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Friedberg, M. K., Silverman, N. H., Dubin, A. M., Rosenthal, D. N.
2007; 20 (6): 756-763
- **Diagnosis of patent ductus arteriosus by a neonatologist with a compact, portable ultrasound machine** *JOURNAL OF PERINATOLOGY*
Lee, H. C., Silverman, N., Hintz, S. R.
2007; 27 (5): 291-296
- **Echocardiographic diagnosis of persistent fifth aortic arch** *ECHOCARDIOGRAPHY-A JOURNAL OF CARDIOVASCULAR ULTRASOUND AND ALLIED TECHNIQUES*
Bernheimer, J., Friedberg, M., Chan, F., Silverman, N.
2007; 24 (3): 258-262
- **The systolic to diastolic duration ratio in children with heart failure secondary to restrictive cardiomyopathy** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Friedberg, M. K., Silverman, N. H.
2006; 19 (11): 1326-1331
- **Aortopulmonary window with anomalous origin of the right coronary artery from the pulmonary artery: Two cases highlighting the importance of complete pre-operative echocardiographic evaluation of the coronary arteries in all conotruncal anomalies** *EUROPEAN JOURNAL OF ECHOCARDIOGRAPHY*
Greenway, S. C., Bradley, T. J., Caldarone, C. A., Silverman, N. H., Hanley, F. L., Smallhorn, J. F.
2006; 7 (5): 379-382
- **Diagnosis and prognosis of fetuses with double outlet right ventricle** *PRENATAL DIAGNOSIS*
Kim, N., Friedberg, M. K., Silverman, N. H.
2006; 26 (8): 740-745
- **Images in cardiovascular medicine. Near sudden death from cardiac lipoma in an adolescent.** *Circulation*
Friedberg, M. K., Chang, I. L., Silverman, N. H., Ramamoorthy, C., Chan, F. P.
2006; 113 (21): e778-9

- **Echo-morphological correlates concerning the functionally univentricular heart in the setting of isomeric atrial appendages** *5th Annual International Symposium on Congenital Heart Disease*
Mahle, W. T., Silverman, N. H., Marx, G. R., Anderson, R. H.
CAMBRIDGE UNIV PRESS.2006: 35-42
- **Cardiac ventricular diastolic and systolic duration in children with heart failure secondary to idiopathic dilated cardiomyopathy** *AMERICAN JOURNAL OF CARDIOLOGY*
Friedberg, M. K., Silverman, N. H.
2006; 97 (1): 101-105
- **Isomerism of the left atrial appendage associated with ventricular noncompaction** *AMERICAN JOURNAL OF CARDIOLOGY*
Friedberg, M. K., Ursell, P. C., Silverman, N. H.
2005; 96 (7): 985-990
- **Myofibroblastic tumor of the heart: A rare intracardiac tumor** *JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY*
Gandy, K. L., Burtelow, M. A., Reddy, V. M., Silverman, N. H.
2005; 130 (3): 888-889
- **Right ventricular outflow tract obstruction in an infant.** *Heart*
Friedberg, M., Silverman, N. H.
2005; 91 (6): 748-?
- **Mitral valve leaflet excursion velocity in the pediatric population: A comparable diastolic index to the color m-mode propagation velocity** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Friedberg, M. K., Silverman, N. H.
2005; 18 (2): 142-147
- **Measurement of the Tei index: A comparison of m-mode and pulse Doppler methods** *JOURNAL OF THE AMERICAN SOCIETY OF ECHOCARDIOGRAPHY*
Tham, E. B., Silverman, N. H.
2004; 17 (12): 1259-1265
- **Changing indications for fetal echocardiography in a University Center population** *PRENATAL DIAGNOSIS*
Friedberg, M. K., Silverman, N. H.
2004; 24 (10): 781-786