Stanford



Chad S. Weldy, M.D., Ph.D.

Assistant Professor of Medicine (Cardiovascular Medicine)

Medicine - Cardiovascular Medicine

CLINICAL OFFICE (PRIMARY)

- **Stanford Health Care Cardiovascular Medicine**
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Bio

BIO

Dr. Chad Weldy is a clinical cardiologist specializing in inherited cardiomyopathies and a faculty member in the Division of Cardiovascular Medicine at Stanford University School of Medicine. He cares for patients and families with genetic heart disease—including hypertrophic and dilated cardiomyopathy—through the Stanford Center for Inherited Cardiovascular Disease (SCICD), where he trained under Dr. Euan Ashley. Dr. Weldy also serves as the co-director for the Stanford Translational Investigator Program (TIP) through the Stanford Internal Medicine Residency Program.

As a physician-scientist, Dr. Weldy leads a research program focused on defining how human genetic variation translates into causal mechanisms of cardiovascular disease. His work integrates human genetics with single-cell genomics and molecular biology to uncover pathways governing vascular cell identity and disease progression. He has made key contributions to understanding ADAR1-mediated RNA editing and RNA sensing as drivers of cardiovascular pathology (Weldy et al., Nature Cardiovascular Research, 2025; PMID 40958051), as well as the epigenomic landscape of vascular cells across anatomical territories (Molecular Systems Biology, 2025; PMID 40931195).

Dr. Weldy received his M.D. from Duke University School of Medicine and completed his internal medicine residency and cardiology fellowship at Stanford University as part of the Stanford Translational Investigator Program (TIP). During his fellowship, he trained in the laboratory of Dr. Thomas Quertermous, where he studied epigenetic and RNA-based mechanisms of cardiovascular disease. He also holds a Ph.D. from the University of Washington and completed postdoctoral training in cardiovascular biology, with a focus on redox biology, toxicology, and epigenetics.

His research is supported by an NIH/NHLBI K08 Clinical Scientist Development Award, an American Heart Association Career Development Award, an NIH F32 NRSA Fellowship, and an NIH Loan Repayment Award. At Stanford, he has received the Gerald Reaven Award for Basic Science, the Timothy F. Beckett Jr. Award for Excellence in Clinical Teaching, and was inducted into Alpha Omega Alpha (AOA).

Dr. Weldy is originally from Bainbridge Island, Washington. Outside of medicine, he enjoys running, cycling, snowboarding, and spending time with his wife and two children.

CLINICAL FOCUS

- Inherited Cardiovascular Disease
- Cardiovascular Genetics
- Cardiovascular Disease
- Hypertrophic cardiomyopathy
- Dilated Cardiomyopathy
- arrhythmogenic cardiomyopathy
- Left ventricular noncompaction cardiomyopathy

ACADEMIC APPOINTMENTS

- Assistant Professor-Univ Med Line, Medicine - Cardiovascular Medicine
- Member, Cardiovascular Institute

ADMINISTRATIVE APPOINTMENTS

- Co-director, Translational Investigator Program (TIP), Stanford University, Department of Medicine, Internal Medicine Residency, (2026- present)

HONORS AND AWARDS

- Co-Director, Translational Investigator Program (TIP), Stanford University, Department of Medicine, Internal Medicine Residecy (July 2026)
- 2024 Louis N. and Arnold M. Katz Basic Science Research Prize — Finalist, American Heart Association, BCVS (August, 2024)
- NIH/NHLBI K08 Mentored Clinical Scientist Development Award, NIH/NHLBI (August, 2023)
- AHA Career Development Award (CDA), American Heart Association (March, 2023)
- NIH Loan Repayment Program (LRP) Award, NIH/NHLBI (July, 2021)
- Ruth L. Kirschstein National Research Service Award (NRSA) Individual Postdoctoral Fellowship (F32), NIH/NHLBI (July, 2021)
- Gerald Reaven Award for Basic Science, Stanford University (June, 2021)
- Timothy F. Beckett Jr. Award for Best Clinical Teaching by a Medicine Fellow, Stanford University (June, 2021)
- AOA - Alpha Omega Alpha Medical Honor Society, Stanford University School of Medicine (6/2020)
- 2019 Residency Research Travel Award, Stanford University Internal Medicine Residency Program (April, 2019)
- 2014 Paper of the Year Award, Society of Toxicology, Inhalation and Respiratory Specialty Section (March 24, 2014)
- 2014 Postdoctoral Travel Award, Society of Toxicology, Cardiovascular Toxicology Specialty Section (March 25, 2014)
- 1st Place Postdoctoral Presentation Award, Pacific Northwest Association of Toxicologists (September 2013)
- 2012 Innovations in Research Award, University of Washington Center for Ecogenetics and Environmental Health (CEEH) (May 2012)
- Departmental nominee and one of four finalists, University of Washington Graduate School Medal (May 2011)
- Young Investigator Award (YIA), Society for Free Radical Biology and Medicine (SFRBM) (November 2011)
- 1st Place Student/Post Doc Oral Presentation Award, Pacific Northwest Association of Toxicologists (October 2010)
- 2007 Professor Ming-Ho Yu Award: Outstanding Student in Environmental Toxicology, Huxley College of the Environment, Western Washington University (May 2007)

PROFESSIONAL EDUCATION

- Board Certification: Adult Echocardiography (2021)N/A
- Board Certification: Cardiovascular Disease, American Board of Internal Medicine (2023)
- Residency: Stanford University Internal Medicine Residency (2019) CA
- Fellowship: Stanford University Cardiovascular Medicine Fellowship Program CA

- Board Certification: Internal Medicine, American Board of Internal Medicine (2020)
- Medical Education: Duke University School of Medicine (2017) NC
- Cardiovascular Med Fellowship, Stanford University Hospitals , Cardiology (2023)
- Internal Medicine Residency, Stanford University Hospitals , Internal Medicine (2019)
- Internal Medicine Internship, Stanford University Hospitals , Internal Medicine (2018)
- MD, Duke University School of Medicine , Medicine (2017)
- Postdoctoral Fellowship, University of Washington, School of Medicine, Division of Cardiology , Cardiovascular Biology, Heart Failure, Epigenetics (2014)
- PhD, University of Washington, School of Public Health , Toxicology, Vascular Physiology, Free Radical Biology (2012)
- BS, Western Washington University, Huxley College of the Environment , Environmental Toxicology, Chemistry (2007)

LINKS

- Weldy Lab Website: https://weldylab.org/
- X profile: https://x.com/ChadSWeldy

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Weldy Lab studies how human genetic variation drives vascular dysfunction, inflammation, and cardiovascular disease. We integrate human genetics, epigenetics, single-cell genomics, RNA biology, and experimental models to define causal mechanisms and identify new therapeutic opportunities.

Led by Chad S. Weldy, MD, PhD, the lab focuses on questions at the intersection of cardiovascular genetics, vascular biology, and RNA-mediated regulation, with particular interest in smooth muscle cell phenotypic modulation, innate immune signaling, and mechanisms of disease susceptibility governed by epigenetic memory.

Our work is grounded in the idea that genetic discovery can do more than identify risk. It can reveal the biology that matters most and point toward more precise strategies for prevention and treatment.

https://weldylab.org/

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Laila Rad

Postdoctoral Research Mentor

Laila Rad

Publications

PUBLICATIONS

- **Polyethylene and Polyvinyl Chloride Nanoplastics Accelerate Atherosclerosis Through Distinct Smooth Muscle Cell Phenotypic Transitions.** *medRxiv : the preprint server for health sciences*

Zheng, S., Gu, W., Zhao, Q., Kojima, Y., Palm, K. C., Mokry, M., Jarr, K. U., Gao, H., Damiani, I., Qin, G., Bahia, G., Basu, S., Kundu, et al
2026

- **Vascular smooth muscle cell state trajectories mediate molecular mechanisms of coronary disease risk.** *Nature communications*
  Li, D. Y., Kundu, S., Cheng, P., Gu, W., Worssam, M. D., Jackson, W. R., Zhao, Q., Nguyen, T., Yu, A. M., Monteiro, J. P., Caceres, R. D., Dale, S., Palmisano, et al
  2026

- **Adenosine-to-Inosine (A-to-I) RNA Editing by ADAR1 to Control RNA Sensing in Cardiovascular Disease.** *Arteriosclerosis, thrombosis, and vascular biology*
  Weldy, C. S., Li, J. B., Quertermous, T.
  2026

- **A cell and transcriptome atlas of human arterial vasculature.** *Cell genomics*
  Zhao, Q., Pedroza, A., Sharma, D., Gu, W., Dalal, A., Weldy, C., Jackson, W., Li, D. Y., Ryan, Y., Nguyen, T., Shad, R., Palmisano, B. T., Monteiro, et al
  2025: 101034

- **Smooth muscle expression of RNA editing enzyme ADAR1 controls activation of the RNA sensor MDA5 in atherosclerosis.** *Nature cardiovascular research*
  Weldy, C. S., Li, Q., Monteiro, J. P., Peters, T. S., Guo, H., Galls, D., Gu, W., Cheng, P. P., Ramste, M., Li, D., Palmisano, B. T., Sharma, D., Worssam, et al
  2025

- **Epigenomic landscape of single vascular cells reflects developmental origin and disease risk loci.** *Molecular systems biology*
  Weldy, C. S., Kundu, S., Monteiro, J., Gu, W., Pedroza, A. J., Dalal, A. R., Worssam, M. D., Li, D., Palmisano, B., Zhao, Q., Sharma, D., Nguyen, T., Kundu, et al
  2025

- **Enhancer-targeting CRISPR screens at coronary artery disease loci suggest shared mechanisms of disease risk.** *medRxiv : the preprint server for health sciences*
  Ramste, M., Weldy, C., Kundu, S., Zhao, Q., Li, D., Brand, K., Sharma, D., Ramste, A., Jagoda, E., Ray, J., Caceres, R. D., Galante, J., Gschwind, et al
  2025

- **Epistasis regulates genetic control of cardiac hypertrophy.** *Nature cardiovascular research*
  Wang, Q., Tang, T. M., Youlton, M., Weldy, C. S., Kenney, A. M., Ronen, O., Hughes, J. W., Chin, E. T., Sutton, S. C., Agarwal, A., Li, X., Behr, M., Kumbier, et al
  2025

- **Environmental pollutants and atherosclerosis: Epigenetic mechanisms linking genetic risk and disease.** *Atherosclerosis*
  Damiani, I., Solberg, E. H., Iyer, M., Cheng, P., Weldy, C. S., Kim, J. B.
  2025: 119131

- **Deciphering the impact of genomic variation on function.** *Nature*
  2024; 633 (8028): 47-57

- **One-year real-world experience with mavacamten and its physiologic effects on obstructive hypertrophic cardiomyopathy** *FRONTIERS IN CARDIOVASCULAR MEDICINE*
  Kim, D., Chu, E. L., Keamy-Minor, E. E., Paranjpe, I., Tang, W. L., O'Sullivan, J. W., Desai, Y. B., Liu, M. B., Munsey, E., Hecker, K., Cuenco, I., Kao, B., Bacolor, et al
  2024; 11

- **Genome-Wide Genetic Associations Prioritize Evaluation of Causal Mechanisms of Atherosclerotic Disease Risk.** *Arteriosclerosis, thrombosis, and vascular biology*
  Quertermous, T., Li, D. Y., Weldy, C. S., Ramste, M., Sharma, D., Monteiro, J. P., Gu, W., Worssam, M. D., Palmisano, B. T., Park, C. Y., Cheng, P.
  2024; 44 (2): 323-327

- **From Founder to Function: can we unravel phenotype from genotype?** *Heart rhythm*
  Weldy, C. S., Perez, M. V.
  2023

- **Discovery of Transacting Long Noncoding RNAs That Regulate Smooth Muscle Cell Phenotype.** *Circulation research*
  Shi, H., Nguyen, T., Zhao, Q., Cheng, P., Sharma, D., Kim, H. J., Brian Kim, J., Wirka, R., Weldy, C. S., Monteiro, J. P., Quertermous, T.
  2023
- **Molecular mechanisms of coronary artery disease risk at the PDGFD locus.** *Nature communications*
  Kim, H., Cheng, P., Travisano, S., Weldy, C., Monteiro, J. P., Kundu, R., Nguyen, T., Sharma, D., Shi, H., Lin, Y., Liu, B., Haldar, S., Jackson, et al
  2023; 14 (1): 847
- **miR Profile of Chronic Right Ventricular Pacing: a Pilot Study in Children with Congenital Complete Atrioventricular Block.** *Journal of cardiovascular translational research*
  Navarre, B. M., Clouthier, K. L., Ji, X., Taylor, A., Weldy, C. S., Dubin, A. M., Reddy, S.
  2022
- **Dissecting the Genomics of Spontaneous Coronary Artery Dissection.** *Circulation. Genomic and precision medicine*
  Weldy, C. S., Murtha, R., Kim, J. B.
  2022: 101161CIRCGEN122003867
- **Mulibrey Nanism and the Real Time Use of Genome and Biobank Engines to Inform Clinical Care in an Ultrarare Disease.** *Circulation. Genomic and precision medicine*
  Weldy, C. S., Ashley, E. A.
  2021: CIRCGEN121003430
- **Towards precision medicine in heart failure.** *Nature reviews. Cardiology*
  Weldy, C. S., Ashley, E. A.
  2021
- **Circulating whole genome miRNA expression corresponds to progressive right ventricle enlargement and systolic dysfunction in adults with tetralogy of Fallot.** *PloS one*
  Weldy, C. S., Syed, S. A., Amsallem, M., Hu, D., Ji, X., Punn, R., Taylor, A., Navarre, B., Reddy, S.
  2020; 15 (11): e0241476
- **In utero exposure to diesel exhaust particulates is associated with an altered cardiac transcriptional response to transverse aortic constriction and altered DNA methylation** *FASEB Journal*
  Goodson, J. M., Weldy, C. S., MacDonald, J. W., Bammler, T. K., Chien, W., Chin, M. T.
  2017: 4935-4945
- **Neonatal Diesel Exhaust Particulate Exposure Does Not Predispose Mice to Adult Cardiac Hypertrophy or Heart Failure** *INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH*
  Liu, Y., Weldy, C. S., Chin, M. T.
  2016; 13 (12)
- **Myocardial deletion of transcription factor CHF1/Hey2 results in altered myocyte action potential and mild conduction system expansion but does not alter conduction system function or promote spontaneous arrhythmias** *FASEB JOURNAL*
  Hartman, M. E., Liu, Y., Zhu, W., Chien, W., Weldy, C. S., Fishman, G. I., Laflamme, M. A., Chin, M. T.
  2014; 28 (7): 3007-3015
- **In Utero Exposure to Diesel Exhaust Air Pollution Promotes Adverse Intrauterine Conditions, Resulting in Weight Gain, Altered Blood Pressure, and Increased Susceptibility to Heart Failure in Adult Mice** *PLOS ONE*
  Weldy, C. S., Liu, Y., Liggitt, H. D., Chin, M. T.
  2014; 9 (2)
- **In utero and early life exposure to diesel exhaust air pollution increases adult susceptibility to heart failure in mice** *PARTICLE AND FIBRE TOXICOLOGY*
  Weldy, C. S., Liu, Y., Chang, Y., Medvedev, I. O., Fox, J. R., Larson, T. V., Chien, W., Chin, M. T.
  2013; 10
- **Inhalation of diesel exhaust does not exacerbate cardiac hypertrophy or heart failure in two mouse models of cardiac hypertrophy** *PARTICLE AND FIBRE TOXICOLOGY*
  Liu, Y., Chien, W., Medvedev, I. O., Weldy, C. S., Luchtel, D. L., Rosenfeld, M. E., Chin, M. T.
  2013; 10

- **Glutathione (GSH) and the GSH synthesis gene Gclm modulate plasma redox and vascular responses to acute diesel exhaust inhalation in mice** *INHALATION TOXICOLOGY*
  Weldy, C. S., Luttrell, I. P., White, C. C., Morgan-Stevenson, V., Cox, D. P., Carosino, C. M., Larson, T. V., Stewart, J. A., Kaufman, J. D., Kim, F., Chitaley, K., Kavanagh, T. J.
  2013; 25 (8): 444-454

- **The Glutathione Synthesis Gene Gclm Modulates Amphiphilic Polymer-Coated CdSe/ZnS Quantum Dot-Induced Lung Inflammation in Mice** *PLOS ONE*
  McConnachie, L. A., Botta, D., White, C. C., Weldy, C. S., Wilkerson, H., Yu, J., Dills, R., Yu, X., Griffith, W. C., Faustman, E. M., Farin, F. M., Gill, S. E., Parks, et al
  2013; 8 (5)

- **Glutathione (GSH) and the GSH synthesis gene Gclm modulate vascular reactivity in mice** *FREE RADICAL BIOLOGY AND MEDICINE*
  Weldy, C. S., Luttrell, I. P., White, C. C., Morgan-Stevenson, V., Bammler, T. K., Beyer, R. P., Afsharinejad, Z., Kim, F., Chitaley, K., Kavanagh, T. J.
  2012; 53 (6): 1264-1278

- **DIESEL particulate exposed macrophages alter endothelial cell expression of eNOS, iNOS, MCP1, and glutathione synthesis genes** *TOXICOLOGY IN VITRO*
  Weldy, C. S., Wilkerson, H., Larson, T. V., Stewart, J. A., Kavanagh, T. J.
  2011; 25 (8): 2064-2073

- **Heterozygosity in the glutathione synthesis gene Gclm increases sensitivity to diesel exhaust particulate induced lung inflammation in mice** *INHALATION TOXICOLOGY*
  Weldy, C. S., White, C. C., Wilkerson, H., Larson, T. V., Stewart, J. A., Gill, S. E., Parks, W. C., Kavanagh, T. J.
  2011; 23 (12): 724-735