ZOLL FOUNDATION

December 2021 Report

Supporting young investigators worldwide with more than $3.3 million in resuscitation and critical care research grants

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species • Keith Marrill: Potassium cardioplegia with calcium reversal for ventricular fibrillation arrest: a blinded randomized controlled trial • Lauge Vammen: Investigation of organ dysfunction of diabetics following cardiac arrest • Steve Lin: The study of adrenaline and its effects on cardiac arrest • Cindy Hsu: Impact of mask application on aerosol generation during CPR in a swine cardiac arrest model • Jonathan Paul: Study involving cardiogenic shock patients randomized to therapeutic hypothermia plus standard medical care or standard medical care alone • Mathias Holmberg: Test use of Coenzyme Q10 for neuroprotection in post-cardiac arrest patients to mitigate mitochondrial injury • Alexander Lindqwister: Role of electrical impedance in pseudo pulseless electric activity • Katie DeJong: Determining the impact of telemedicine on outcomes after pediatric out-of-hospital cardiac arrest • Jonathan Rud: Level of soluble CD73 association with outcome, and predictive utility for post- cardiac arrest cerebral edema • Allison Cohen: Time for a change: use of Doppler ultrasound for checking pulses in cardiac arrest • Lenny Weiss: Testing the impact of intra- shift naps during night shifts on blood pressure dipping and heart rate variability among EMS clinicians • Christina Skare: Effect of MAP on cerebral perfusion and metabolism after CA in porcine • Edilberto Amorin: Burst suppression with Propofol for seizure control post- cardiac arrest • Felipe Teran-Merino: The usage and effects of epinephrine in pseudo-PEA • Stephanie Frisch: Using machine learning algorithms to predict critical care outcomes from emergency department triage data • Brian Weil: Determine whether systemic allogeneic CDC administration reduces myocardial and neurological injury in swine with post-cardiac arrest syndrome • Michael Glas: Aim to improve initial and long-term survival and diminish neurological damage after global ischemia and reperfusion by administration of Hemarina-M101 after CA • Takamitsu Ikeda: Effects of sedation on post-cardiac arrest neurological recovery • Heyi Li: Multidisciplinary implementation of inspiratory muscle training for mechanically ventilated patients: a feasibility study • Marion Leary: Advance healthcare provider resuscitation quality using an immersive augmented reality CPR training system • Aurora Magliocca: Impact of kynurenin pathway (KP) inhibition on survival and neurological outcome after cardiac arrest and CPR • Salvatore Aiello: Testing hypothesis that shock burden will intensify myocardial injury • Junhwan Kim: Will test the prognostic potential of LPC using an established rate model of cardiac arrest and human patients • Madhan Shanmugasundaram: Test hypothesis that rapidly induced therapeutic hypothermia in those with acute coronary occlusion extends the door to perfusion time from 120-240 minutes with no increase in myocardial infarct size • Stéphanie Pons: Endothelial dysfunction and repair during septic shock: transcriptome analysis of circulating endothelial cells and blood outgrowth endothelial cells by RNA-seq • Takeyuki Kiguchi: Establish the effectiveness of physiologically guided resuscitation by use of NIRS during CPR • Michael Silverman: Determine potential neuroprotective effects of dexmedetomidine • Alexandra Weissman: Test the feasibility and yield of nanopore sequencing, as compared to culture, for assessment of body fluid speciments from post cardiac arrest patients • Guillaume Hoareau: Hypothesize that CPR augmented by balloon aortic occlusion benefits from adaptive balloon-wealing protocol tailored to maintain a blood pressure • Wendy Van Ittersum: Rapid cycle deliberate practice in first five minutes training to improve team dynamics and resuscitation skills • Mohd Fazrul Mokhtar: Augmented reality-cardiopulmonary resuscitation (AR-CPR) interactive handbook: A feasibility study of augmented reality basic life support training for Malaysia public users • Kei Hayashida: Targeting heme 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President's Message

Dear Colleagues:

We are pleased to issue our fourth report on the activities of the ZOLL Foundation. It covers the types of research and the support provided to our target group of young researchers in resuscitation and critical care; all grants approved as of this writing; the process and timelines for application; and our current financial status. It also recognizes the help we have had in establishing what we now believe will be an enduring organization supporting research in these important areas.

Our Board of Directors serves without compensation; we are especially indebted to Dr. Norman Paradis who guided and shaped our work since agreeing to help us as we started our effort. His dedication has been essential to our work and progress. He has brought his keen and renowned knowledge, science, and experience to our work tirelessly. As applications have grown, the work to review them and score them has grown as well. For our last two rounds of applications we have also had the benefit of Dr. Fumito Ichinose's expertise. As our newest elected Board Director, we thank him for his support and help.

As we look back on our original vision of being a place for younger researchers to apply for initial funds, maybe for their first effort, for studies that could lead to further research and funding from their efforts, we are always pleased to receive reports from our grant recipients of our initial grants facilitating this objective.

I mention just two grants as examples and fully expect these portend more of the same. Dr. Praveen Chandrasekharan's research data from his grant, "A Novel Approach to Bradycardia during Preterm Neonatal Resuscitation Using an Ovine Model of Asphyxia," at the University of Buffalo, recently secured R01 funding from NIH NICHD for further work in this effort to improve resuscitation. Another grant we approved for Dr. Christoph Nabzdyk, at the Mayo Clinic in Rochester, Minnesota, supported preclinical studies of a hemostatic paste that was inspired by the adhesion mechanism of barnacles. This work was published in *Nature Biomedical Engineering* and attracted widespread recognition from the World Economic Forum, given its broad clinical implications. Additional funding from MIT, National Institutes of Health, the National Science Foundation, and the U.S. Army Research Office is helping the team to work toward commercialization of the paste.

With the constraints of COVID affecting everything that could be done in person, the Board also wanted to acknowledge in our report the retirement of Wanchun Tang, MD, a dedicated leader in efforts to improve care, who has brought so much to the field of Critical Care and Resuscitation. Please note our salute to him on the back cover.

We all hope this report will be useful in attracting applications, by explaining the relatively simple digital process and the components of an application and required information for review, and ultimately encourage more competition in the submissions for the grants we will make in the future. We thank you for your interest and support.

Ward M. Hamilton
President
ZOLL Foundation

THE ZOLL FOUNDATION

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Chelmsford, MA 01824
foundation@zollfoundation.org
www.zollfoundation.org

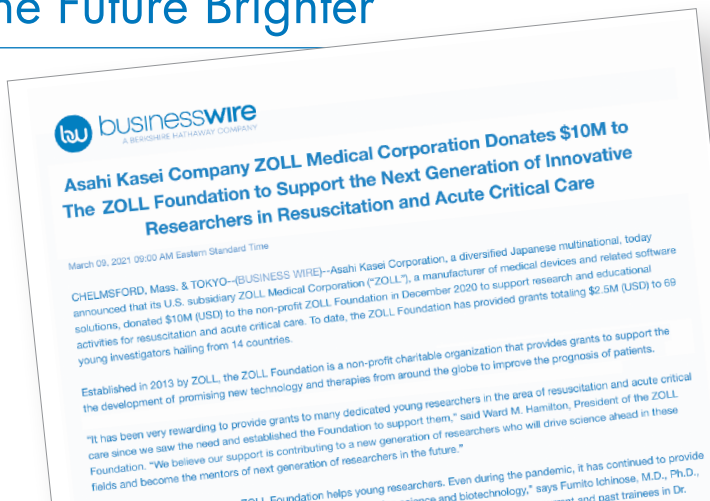
Grants

GRANT TITLE	RECIPIENT	COUNTRY	LEAD INVESTIGATOR
2021: $875,696			
Changes in adult out-of-hospital cardiac arrest outcomes and contributing factors during the COVID-19 pandemic in Texas	Univ. of Texas Health Science Center at Houston	USA	Summer Chavez, DO, MPH, MPM
Nebulized nitroglycerin to improve blood flow during cardiac arrest	Univ. of Utah	USA	Christopher Kelly, MD
Optimizing chest compression location: Is the lower sternum really ideal?	Feinstein Institutes for Medical Research	USA	Daniel Rolston, MD, MDHPM
Reduction of prothrombotic antibodies in COVID-19 patients who received convalescent plasma in the clinical trial of COVID-19 convalescent plasma in outpatients (C3PO)	Univ. of Pittsburgh School of Medicine	USA	Nadine Talia, MD
Impact of mask application on aerosol generation during CPR in a swine cardiac arrest model	Univ. of Michigan	USA	Cindy Hsu, MD, PhD
The therapeutic potential of combinational Lysophosphatidylcholine (LPC) therapy in the treatment of severe injury rodent cardiac arrest	Feinstein Institutes for Medical Research	USA	Muhammad Shoaib, MD, PhD Candidate
Role of hemolysis and nitric oxide consumption after cardiac arrest	Mass. General Hospital	USA	Yusuke Miyazaki, MD, PhD
Safety and feasibility of Kefir administration in critically ill adults receiving antibiotics	Mayo Clinic	USA	Simon Zec, MD
Use of the cold shock protein fibroblast growth factor 21 to enhance hypothermic neuroprotection in a rat model of pediatric asphyxial cardiac arrest	Univ. of Pittsburgh School of Medicine	USA	Jeremy Herrmann, MD
Detecting intrathoracic airway closure during prehospital cardiopulmonary resuscitation	University Hospital Ghent	Belgium	Maxim Vanwulpen, MD
Immunomodulatory therapy for treating brain injury after cardiac arrest	Brigham and Women's Hospital	USA	Tamura Tomoyoshi, MD, PhD
Lipidomics for prognostication after cardiac arrest (LOGIC) study	National Univ. Heart Centre	Singapore	Shir Lynn Lim, MD
Novel insights into the prediction and etiology of in-hospital cardiac arrest	Aarhus Univ. Hospital	Denmark	Peter Carøe Lind, MD
Ex vivo use of a cell-permeable Succinate Prodrug will rescue ischemia and reperfusion injury to mitochondria and cardiac function in donation after circulatory death (DCD) hearts	Virginia Commonwealth Univ.	USA	Jennifer Bradley, PhD
Effect of resuscitation quality improvement (RQI) program on CPR quality in out-of-hospital cardiac arrest	Feinstein Institutes for Medical Research, Northwell Health	USA	Priam Chakraborty, DO
Influence of sedation on neurocognitive outcomes and quality of life following extracorporeal membrane oxygenation for cardiac arrest and post-cardiotomy shock	Stanford Univ. School of Medicine	USA	Melissa Vogelsong, MD
Investigation of myocardial sympathetic denervation as a novel mechanism of ischemia-induced pulseless electrical activity cardiac arrest	State Univ. of New York at Buffalo	USA	Brian Weil, PhD
An informatics-driven approach to a multicenter neonatal resuscitation network	Children's Hospital of Philadelphia	USA	Leah Carr, MD
Translationally relevant swine model of Lipopolysaccharide-induced septic shock to assess a perfusion-centered approach for the management of septic shock	Rosalind Franklin Univ. of Medicine & Science	USA	Shahid Azib, MD

Since it was established through it latest grants, the ZOLL Foundation has now awarded over $3.3 million dollars in to 88 recipients in 16 countries.

A Special Contribution Makes the Future Brighter

In March 2021, Asahi Kasei Corporation, a diversified Japanese multinational, confirmed that its U.S. subsidiary ZOLL Medical Corporation, a manufacturer of medical devices and related software solutions, donated $10M (USD) to the non-profit ZOLL Foundation in December 2020 to support research and educational activities for resuscitation and acute critical care. This donation will pave the way for the award of additional grants well into the future.



businesswire
A BERKSHIRE HATHAWAY COMPANY

Asahi Kasei Company ZOLL Medical Corporation Donates $10M to The ZOLL Foundation to Support the Next Generation of Innovative Researchers in Resuscitation and Acute Critical Care

March 09, 2021 09:00 AM Eastern Standard Time

CHELMSFORD, Mass. & TOKYO--(BUSINESS WIRE)--Asahi Kasei Corporation, a diversified Japanese multinational, today announced that its U.S. subsidiary ZOLL Medical Corporation ("ZOLL"), a manufacturer of medical devices and related software solutions, donated $10M (USD) to the non-profit ZOLL Foundation in December 2020 to support research and educational activities for resuscitation and acute critical care. To date, the ZOLL Foundation has provided grants totaling $2.5M (USD) to 69 young investigators hailing from 14 countries.

Established in 2013 by ZOLL, the ZOLL Foundation is a non-profit charitable organization that provides grants to support the the development of promising new technology and therapies from around the globe to improve the prognosis of patients.

"It has been very rewarding to provide grants to many dedicated young researchers in the area of resuscitation and acute critical care since we saw the need and established the Foundation to support them," said Ward M. Hamilton, President of the ZOLL Foundation. "We believe our support is contributing to a new generation of researchers who will drive science ahead in these fields and become the mentors of next generation of researchers in the future."

ZOLL Foundation helps young researchers. Even during the pandemic, it has continued to provide science and biotechnology," says Fumito Ichinose, M.D., Ph.D., past and past trainees in Dr.

Grants (cont'd)

2020: $765,317

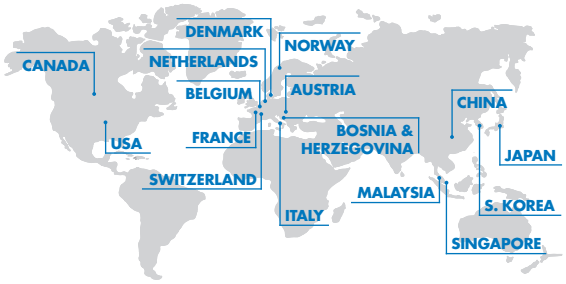
GRANT TITLE	RECIPIENT	COUNTRY	LEAD INVESTIGATOR
Burst suppression with Propofol for seizure control post-CA	Univ. of California	USA	Edilberto Amorin, MD
Assessing synaptic density in CA survivors using [11C] UCB-J PET: a pilot study	Yale New Haven Hospital	USA	Rachel Beekman, MD
A novel approach to bradycardia during pre-term neonatal resuscitation using an ovine model of asphyxia	Univ. at Buffalo	USA	Praveen Chandrasekaran, MD, MS
Time for a change: use of Doppler ultrasound for checking pulses in CA	Feinstein Institutes for Medical Research	USA	Allison Cohen, MD
Using unstructured clinical data to predict critical illness	Univ. of Pittsburgh	USA	Adam Frisch, MD
CPR-REBOA: improving outcome of prehospital cardiopulmonary resuscitation with balloon occlusion of the descending aorta	Univ. Hospital Bern	Switzerland	Anja Levis, MD
Derivation and validation of a clinical decision rule for the early prediction of shock-refractory VT/VF out-of-hospital CA	Oregon Health and Science Univ.	USA	Joshua Lupton, MD
Mitochondrial injury differs with age in rat model	Soochow Univ.	China	Yan Xiao, MD
Bioadhesive paste for instant hemorrhage control of vascular and solid organ injuries	Mayo Clinic	USA	Christoph Nabzdyk, MD
Dodecafluoropentane to reduce ischemic-reperfusion injury in a swine model of CA	Univ. of Florida	USA	Travis Murphy, MD
Evaluating neuroprotective therapies that modulate leukocyte Infiltration into the brain following CA and resuscitation	Univ. of Pittsburgh	USA	Tanner Smida, NREMT-B
Humanizing the (ICU): perspectives of patients & their families on the use of the "Get to Know Me" board	Mayo Clinic	USA	Sumera Ahmad, MBBS
Mitochondrial dynamics as target for inhaled argon therapy after CA	Istituto di Ricerche Farmacoogiche Mario Negri	Italy	Francesca Fumagalli, PhD
Increased mitochondrial-mediated survival with improved neurological recovery after Metformin treatment for brain Injury after cardiac arrest	Feinstein Institutes for Medicine, Northwell Health	USA	Rishabh Choudhary, PhD
Methylene blue for treatment of CA	Aarhus Univ. Hospital	Denmark	Lauge Vammen, MD
Using machine learning algorithms to predict critical care outcomes from ER triage data	Univ. of Pittsburgh	USA	Stephanie Frisch, PhD
Effects of sedation on post-CA neurological recovery	Mass. General Hospital	USA	Takamitsu Ikeda, MD
Multidisciplinary implementation of inspiratory muscle training for mechanically ventilated patients: A feasibility study	Mayo Clinic	USA	Heyi Li, MD
CAMeLOT study: CA prediction by machine learning to improve outcome in tots	Univ. of Texas SW Medical Center	USA	Priscilla Yu, MD
Impaired organ repair after sepsis: role of tissue resident macrophages and recruited monocytes (ORISMO)	INSERM U976 Université de Paris	France	Charles de Roquetaillade, MD
Augmented reality-cardiopulmonary resuscitation (AR-CPR) interactive andbook: A feasibility study of augmented reality basic life support training for Malaysia public users	Universiti Teknologi MARA	Malaysia	Mohd Fazrul Mokhtar, MD
Aloud real-time reading of ICU diaries for prevention of negative post-ICU psychological outcomes: A feasibility study	Mayo Clinic	USA	Kimberly Johnson, MD
Delivery room peak performance for neonates with congenital anomalies	Children's Hospital of Philadelphia	USA	Heidi Herrick, MD

2019: $676,368

Investigate the effects of WIN55, 212-2 on CB2 receptors following cardiopulmonary resuscitation	Virginia Commonwealth Univ.	USA	Jennifer Bradley, MS, CRA
Compare personalized selection of an optimal MAP to each patient vs. standard hemodynamic management with all having same BP goal	Univ. of Pittsburgh School of Medicine	USA	Patrick Coppler, PA-C
Aim to improve initial and long-term survival & diminish neurological damage after global ischem and reperfusion by administration of Hemarina-M101 after CA	Inselspital Bern Univ. Hospital	Switzerland	Michael Glas, MD
Hypothesize that CPR augmented by balloon aortic occlusion benefits from adaptive balloon-wealing protocol tailored to maintain a blood pressure	Travis Air Force Base, Clinical Investigation Facility, CA	USA	Guillaume Hoareau, DVM, PhD
Will test the prognostic potential of LPC using an established rate model of CA and human patients	Feinstein Institute for Medical Reaserch	USA	Junhwan Kim, PhD
Effect of MAP on cerebral perfusion & metabolism after CA in porcine	Oslo Univ. Hospital	Norway	Christina Skare, MD
Improving simulation-based medical education in pediatric resuscitation: Real-time feedback and visual attention	Medical Univ. of Vienna	Austria	Michael Wagner, MD
Test the feasibility and yield of nanopore sequencing, as compared to culture, for assessment of body fluid speciments from post CA patients	Univ. of Pittsburgh	USA	Alexandra Weissman, MD
Mechanisms ot pharmacological hypothermia induced by cannabinoid receptor agonist WIN55, 212-2 on outcomes of CPR	Soochow Univ. Second Affiliated Hospital (Research at VA Commonwealth Univ.)	China/USA	Yan Xiao, MD
Amplitude spectral area to assess hemodynamic and metabolic interventions during CA	Rosalind Franklin Univ. of Medicine & Science	USA	Salvatore Aiello, MD PhD Student

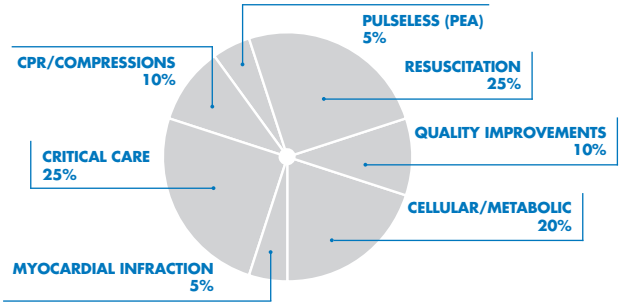
Wide Geographic Coverage

as of January 2020



Typical Research Categories

as of January 2020



2019 (cont'd)

GRANT TITLE	RECIPIENT	COUNTRY	LEAD INVESTIGATOR
Intensive care knowledge translation in practice (ICU knowledge-TIP)	Univ. Clinical Center of Republika Srpska	Bosnia and Herzegovina	Pedja Kovacevic, MD, PhD
Targeting heme oxygenase-1 with H2 gas inhalation to improve CA outcomes	Feinstein Institutes for Medical Research	USA	Kei Hayashida, MD, PhD
Mitigation of ischemia-reperfusion injury and cardiovascular collapse during resuscitative endovascular balloon occlusion of the aorta in trauma using adenosine, lidocaine, and magnesium	Madigan Army Medical Center Joint Base Lewis-McChord, WA	USA	Daniel Lammers, MD
Endothelial dysfunction and repair during septic shock: transcriptome analysis of circulating endothelial cells and blood outgrowth endothelial cells by RNA-seq	INSERM U976 Université de Paris	France	Stéphanie Pons, MD
Level of soluble CD73 association with outcome, and predictive utility for post-CA cerebral edema	Maine Medical Center	USA	Jonathan Rud, DO, PhD
Sex hormone differences in CA patients	Univ. of Illinois at Chicago	USA	Pavitra Kotini-Shah, MD
Improving successful defibrillation of ventricular fibrillation in a porcine model of CA using machine learning algorithms with physiology guided resuscitation	Li Ka Shing Knowledge Institute	Canada	Rohit Mohindra, MD
Testing the impact of intra-shift naps during night shifts on blood pressure dipping and heart rate variability among EMS clinicians	Univ. of Pittsburgh	USA	Lenny Weiss, MD

2018: $706,057

Test hypothesis that rapidly induced therapeutic hypothermia in those with acute coronary occlusion extends the door to perfusion time from 120-240 minutes with no increase in myocardial infarct size	Univ. of Arizona	USA	Madhan Shanmugasundaram, MD
Determining the impact of telemedicine on outcomes after pediatric out-of-hospital CA	Avera McKenna Hospital	USA	Katie A. DeJong, DO
Role of electrical impedance in pseudo pulseless electrical activity	Dartmouth Hitchcock Medical Center	USA	Alexander Lindqwister, MD Candidate
The usage and effects of epinephrine in pseudo-PEA	Univ. of Pennsylvania	USA	Felipe Teran-Merino, MD
Impact of kynurenin pathway (KP) inhibition on survival and neurological outcome after CA and CPR	Istituto di Ricerche Farmacologiche Mario Negri	Italy	Aurora Magliocca, MD
Define subsets of pulseless electrical activity (PEA) following initial out-of-hospital cardiac rhythm analysis using machine learning	Univ. of Pennsylvania	USA	Steven Balian, MD
Advance healthcare provider resuscitation quality using an immersive augmented reality CPR training system	Univ. of Pennsylvania	US	Marion Leary, MD
Mechanisms of coagulation following OHCA and how influenced by post arrest care including therapeutic hypothermia.	Yeouido St. Mary's Hospital, Seoul	S. Korea	Jeong Ho Park, MD, PhD
Testing hypothesis that shock burden will intensify myocardial injury	Rosalind Franklin Univ. of Medicine and Science	USA	Salvatore Aiello, MS
Feasiblity of random allocation to active RIC vs. Sham RIC upon ED arrival following resuscitation	Univ. of Washington	USA	Emily Bartlett, MD
Investigate the pharmacokinetics of ART-123 in healthy pigs to verify that the relativelynprolonged circulation times seen in other species will be reproduced in swine	Univ. of Michigan	USA	Colin Greineder, MD
Determine potential neuroprotective effects of dexmedetomidine	Mass. General Hospital Simches Research Center	USA	Michael Silverman, MD
Rapid cycle deliberate practice in first five minutes training to improve team dynamics and resuscitation skills	Northeast Ohio Medical Univ.	USA	Wendy Van Ittersum, MD
Determine whether systemic allogeneic CDC administration reduces myocardial and neurological injury in swine with post-CA syndrome	Univ. of Buffalo	USA	Brian Weil, PhD
Investigate whether the three second pause in compressions is long enough to provide two ventilations when using mechanical chest compressions during out-of-hospital CA	Amsterdam University Medical Center	Netherlands	Hans van Schuppen, MD
Establish the effectiveness of physiologically guided resuscitation by use of NIRS during CPR	Kyoto Univ. Health Service	Japan	Takeyuki Kiguchi, MD

Grants (cont'd)

GRANT TITLE	RECIPIENT	COUNTRY	LEAD INVESTIGATOR
2017: $193,525			
Investigation of organ dysfunction of diabetics following CA	Aarhus Univ. Hospital	Denmark	Lauge Vammen, MD
The study of adrenaline and its effects on CA	St. Michael's Univ.	Canada	Steve Lin, MD
Use eye-tracking technology to characterize how providers focus their visual attention during newborn resuscitation and assess the impact of a novel resuscitation monitor	Univ. of Pennsylvania	USA	Elizabeth E. Foglia, MD
Study involving cardiogenic shock patients randomized to therapeutic hypothermia plus standard medical care or standard medical care alone	Univ. of Chicago Medicine	USA	Jonathan Paul, MD
Test use of Coenzyme Q10 for neuroprotection in post-CA patients to mitigate mitochondrial injury	Aarhus Univ. Hospital	Denmark	Mathias Holmberg, MD
A scoping review of existing studies investigating OHCA in the Arab Gulf Region	Fanshawe College	Canada	Alan M. Batt, MICP
2016-2014: $130,681			
Implementation of a multicenter registry for pediatric ED resuscitations using video recording	Univ. of Pennsylvania	USA	Aaron Donoghue, MD
Development of multimodal monitoring and treatment protocols for high-risk post-arrest patients	Univ. of Pittsburgh	USA	Jonathan Elmer, MD
Optimizing public access defibrillation deployment incorporating hours of operation	Univ. of Toronto	Canada	Timothy Chan, PhD
Test hypothesis that therapeutic hypothermia will be anti-arrhythmic during resuscitation and improve ROSC after VF arrest	Case Western Reserve Univ.	USA	Joseph Stephen Piktel, MD
Investigate temporal differences between asphyxial induced CA (ACA) and ventricular fibrillation induced CA (VFCA) and its impact on myocardial and neurological injury; examine the temporal changes in brain and cardiac ATP levels, antioxidant reserve, and the generation of reactive oxygen species	Aarhus Univ. Hospital	Denmark	Soren Rahbek, MD
Potassium cardioplegia with calcium reversal for ventricular fibrillation arrest: a blind randomized controlled trial	Univ. of Pittsburgh	USA	Keith Marrill, MD

"Our findings with this grant have been shared with the world experts on this line of research, who feel very excited regarding these preliminary findings. Thank you for all your support; our work would not have been possible without your help!"

Daniel Lammers, MD
General Surgery
Madigan Army Medical Center
Joint Base Lewis-McChord, WA
USA

ABOUT THE FOUNDATION

The ZOLL Foundation, Inc. was established in 2013 by ZOLL Medical Corporation, an Asahi Kasei Group Company, to promote research in resuscitation and acute critical care by providing grants to support research, education and public awareness related to improving resuscitation practices, preventing patient deterioration associated with cardiac arrest and morbidity, and enhancing the care of acute patients to reduce mortality and morbidity. The ZOLL Foundation is a Massachusetts non-profit corporation and a private foundation under Section 501(c)(3) of the Internal Revenue Code of 1986, as amended. The Foundation is registered with the Non-Profit/Organizations/Public Charities Division of the Office of the Attorney General of Massachusetts. The Foundation adheres to policies governing conflicts of interest, grant-making procedures, and records retention. The Foundation's fiscal year ends on March 31 of each year.

The Foundation has been supported by substantial donations from ZOLL Medical Corporation, Asahi Kasei, The Packer Family Trust, donations from ZOLL executives and employees, and ongoing contributions from members of the ZOLL and Asahi Kasei Group companies.

The Foundation provides grants to U.S. organizations classified as 501(c)(3) public charities or private foundations, and to foreign organizations whose activities are in furtherance of the Foundation's charitable mission to promote research in resuscitation and acute critical care. The Foundation does not provide grants for payment of overhead charges or costs not related to the grant-related research.

The Foundation exits as an independent entity from ZOLL Medical Corporation. Its Board of Directors includes three outside directors who are not affiliated with ZOLL Medical and four directors who are ZOLL employees or retirees.

How to Apply for a Grant

The ZOLL Foundation has bi-annual application deadlines of March 31 and September 30 each year.

Requests for support from the Foundation can be made at these designated times via a simple application. Applications, whether from an individual or an organization, must include a reference from a health care professional recommending the project. Applicants must also disclose any conflicts of interest in accordance with their institution's or agency's policies.

The application is web-based at **www.zollfoundation.org**. All forms can be completed electronically, and materials requested uploaded, such as a description of the proposed research, budget and details, references, professional recommendation and other associated materials. We can assist with questions by email. Receipt of applications will be confirmed with an immediate email confirmation. Applications are reviewed bi-annually by the Board of Directors.

Approvals are oriented toward:

- early research in new therapies or techniques;
- reviews of data and information to better understand practices in the field of resuscitation and acute critical care;
- educational activities combined with measurement to enhance care;
- promising start-up projects whose initial results may allow researchers to seek additional funding from other sources, allowing for continued research that will require more extensive trials or scale.

The Board of Directors will respond to all proposals during two application deadlines per year, and will on occasion request further information or have direct discussions with grant applicants.

Approved grants will be listed on the ZOLL Foundation website at **www.zollfoundation.org**

Eligibility

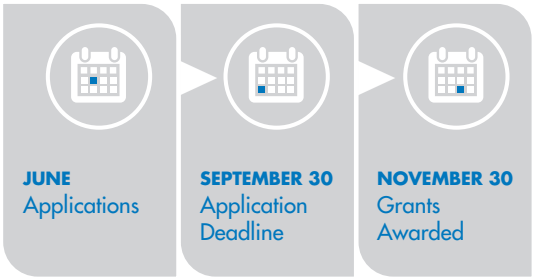
Grant applicants must meet minimum criteria:

- Be a newer researcher, ideally recommended by a more established investigator
- Have a formal association with an institution or agency involved in resuscitation or acute critical care in a medical, scientific, educational, or administrative capacity
- Individual applicants must not be under any professional restrictions and must have all required certifications or licenses necessary to practice their occupation
- Funds awarded will not cover institutional overhead costs

Application Review Schedule

SPRING

FALL



Contact

ZOLL Foundation
269 Mill Rd.
Chelmsford, MA 01824
foundation@zollfoundation.org

Thank You

The ZOLL Foundation acknowledges and thanks the many researchers who have submitted applications and helped to establish this foundation's activities. We regret we are not able to fund all applicants.

The Foundation also acknowledges and thanks the organizations and individuals who have and continue to contribute to the Foundation. These contributions have ensured sufficient resources to pursue the goals we established in the formation of the organization.

Daniel Lammers: Mitigation of ischemia-reperfusion injury and cardiovascular collapse during resuscitative endovascular balloon occlusion of the aorta in trauma using adenosine, lidocaine, and magnesium • Pavitra Kotini-Shah: Sex hormone differences in cardiac arrest patients • Yan Xiao: Mechanisms of pharmacological hypothermia induced by cannabinoid receptor agonist WIN55, 212-2 on outcomes of CPR • Anja Levis: CPR-REBOA: improving outcome of prehospital cardiopulmonary resuscitation with balloon occlusion of the descending aorta • Hans van Schuppen: Investigate whether the three second pause in compressions is long enough to provide two ventilations when using mechanical chest compressions during out-of-hospital cardiac arrest • Lauge Vammen: Methylene blue for treatment of cardiac arrest • Kimberly Johnson: Aloud real-time reading of ICU diaries for prevention of negative post-ICU psychological outcomes: A feasibility study • Adam Frisch: Using unstructured clinical data to predict critical illness • Joshua Lupton: Derivation and validation of a clinical decision rule for the early prediction of shock-refractory VTVF out-of-hospital cardiac arrest • Colin Greineder: Investigate the pharmacokinetics of ART-123 in healthy pigs to verify that the relatively prolonged circulation times seen in other species will be reproduced in swine room peak performance anomalies • Alan M. Batt: A studies investigating OHCA • Daniel Rolston: Optimizing Is the lower sternum really Mechanisms of coagulation influenced by post arrest hypothermia • Charles de organ repair after sepsis: macrohages and recruited • Yusuke Miyazak: Role oxide consumption after Paul: Study involving randomized to therapeutic medical care or standard Choudhary: Increased survival with improved metformin treatment for arrest • Alexandra Weissman: of nanopore sequencing, assessment of body cardiac arrest patients • synaptic density in cardiac UCB-J PET: a pilot study study: Cardiac arrest learning to improve outcome Nebulized nitroglycerin during cardiac arrest • neuroprotective therapies infiltration into the brain • Heidi Herrick: Delivery for neonates with congenital scoping review of existing in the Arab Gulf Region chest compression location: ideal? • Jeong Ho Park: following OHCA and how care including therapeutic Roquetaillade: Impaired role of tissue resident monocytes (ORISMO) of hemolysis and nitric cardiac arrest • Jonathan cardiogenic shock patients hypothermia plus standard medical care alone • Rishabh mitochondrial-mediated neurological recovery after brain injury after cardiac Test the feasibility and yield as compared to culture, for fluid speciments from post Rachel Beekman: Assessing arrest survivors using [11C] • Priscilla Yu: CAMeLOT prediction by machine in tots • Christopher Kelly: to improve blood flow Tanner Smida: Evaluating that modulate leukocyte following cardiac arrest and resuscitation • Steven Balian: Define subsets of pulseless electrical activity (PEA) following initial out-of-hospital cardiac rhythm analysis using machine learning • Nadine Talia: Reduction of prothrombotic antibodies in COVID-19 patients who received convalescent plasma in the clinical trial of COVID-19 convalescent plasma in outpatients (C3PO) • Praveen Chandrasekaran: A novel approach to bradycardia during pre-term neonatal resuscitation using an ovine model of asphyxia • Francesca Fumagalli: Mitochondrial dynamics as target for inhaled argon therapy after cardiac arrest • Rohit Mohindra: Improving successful defibrillation of ventricular fibrillation in a porcine model of cardiac arrest using machine learning algorithms with physiology guided resuscitation • Travis Murphy: Dodecafluoropentane to reduce ischemic-reperfusion injury in a swine model of cardiac arrest • Sumera Ahmad: Humanizing the intensive care unit (ICU): Perspectives of patients and their families on the use of the get to know me board • Muhammad Shoaib: The therapeutic potential of combinational Lysophosphatidylcholine (LPC) therapy in the treatment of severe injury rodent cardiac arrest • Christoph Nabzdyk: Bioadhesive paste for instant hemorrhage control of vascular and solid organ injuries • Summer Chavez: Changes in adult out-of-hospital cardiac arrest outcomes and contributing factors during the COVID-19 pandemic in Texas • Yan Xiao: Mitochondrial injury differs with age in rat model

Wanchun Tang, MD, MCCM, FAHA, FNIA

The ZOLL Foundation wishes to acknowledge the retirement of Dr. Wanchun Tang, a pillar and a close friend of us all in Resuscitation and Critical Care. Dr. Tang's recent academic appointments have been at The Keck School of Medicine, University of Southern California, and the Department of Emergency Medicine, Virginia Commonwealth University. He is an editor for numerous publications and member of many organization councils. COVID-19 restrictions have prevented a gathering of colleagues and friends to celebrate his contributions. We felt it an honor to salute him in our report.

His work and that of his mentor, Dr. Max Harry Weil, is known all over the world and is at the core of much basic science in the field of cardiopulmonary resuscitation, emergency cardiac care, and critical care medicine. He has been involved in the training of over 400 Fellows, who now practice worldwide during his leadership at the Weil Institute, where he became President in 2006. He founded and has directed a second Weil Institute in China that will add to our knowledge in these fields. He has published more than 200 peer-reviewed papers of his work.

His impact is especially notable in his support of young investigators and inspiring many of us involved in these fields. He has co-convened or convened the Wolf Creek Meeting on Resuscitation 16 times. This prestigious invitation-only event was first convened in the 1960s as resuscitation was dawning as a discipline to advance the science and the technology. It has brought leaders in the medical community and industry together since its beginning. It has provided a unique source of cross fertilization between research, patient care, industry and technology. The Weil Institute's Fellows have always been a part of these meetings and have been recognized with no fewer than 22 Young Investigator Awards by the American Heart Association over the years. There are just too many other awards to begin to mention them all in this salute.

Dr. Wanchun Tang has been a tireless contributor to the science of resuscitation and inspired many around the world to improve care with his quiet and thoughtful wisdom and extraordinary knowledge.

Thank you, Dr. Tang.