

Tiffany S. Ko

Postdoctoral Research Fellow, Division of Neurology, Children's Hospital of Philadelphia

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[Google Scholar](#)

EDUCATION

2018	Ph.D., Bioengineering HHMI-NIBIB Interfaces Scholar in Biomedical Imaging	University of Pennsylvania Philadelphia, PA
2012	M.S., Bioengineering Masters in Translational Medicine Program	University of California, Berkeley – University of California, San Francisco, San Francisco, CA
2009	B.S.E, Electrical Engineering Certificate (Minor) in Engineering Biology	Princeton University Princeton, NJ

RESEARCH & PROFESSIONAL POSITIONS

Jan '19 – Present	Children's Hospital of Philadelphia – Neurology (Philadelphia, PA)	<i>Postdoctoral Fellow</i>
	<ul style="list-style-type: none">- Grant Support:<ul style="list-style-type: none">o NIH NHLBI T32HL007915 (<i>Contact PD: Dr. Robert J. Levy</i>)o CHOP Frontier Program: “Biomedical Optical Devices to Monitor Cerebral Health” (Co-Investigator)- Non-invasive neuromonitoring guidance of deep hypothermic cardiopulmonary bypass and intermittent cerebral perfusion during surgical repair of congenital cardiac defects in children.- Predictive modeling of survival and neurological outcomes from multimodal monitoring of neurological and systemic physiology in pediatric swine models of cardiopulmonary bypass and cardiopulmonary resuscitation	
Mar '13 – Dec '18	Children's Hospital of Philadelphia – Neurology (Philadelphia, PA) Univ. of Pennsylvania – Dept. of Bioengineering (Philadelphia, PA)	<i>Doctoral Candidate</i>
	<ul style="list-style-type: none">- <i>Dissertation Title:</i> “Diffuse Optical Cerebral Diagnostics for Real-Time Guidance during Pediatric Surgery and Resuscitation” Non-invasive diffuse optical monitoring of cerebral blood flow, oxygenation, and metabolism in pediatric swine models of deep hypothermic circulatory arrest and cardiopulmonary resuscitation. (<i>Grant Support: NIH NICHD F31-HD085731; Advisers: Dr. Arjun G. Yodh and Dr. Daniel J. Licht</i>)- Longitudinal study of the association of pre-, intra-, and post-operative cerebral hemodynamics with post-operative outcomes in neonates with severe congenital heart disease	

Tiffany S. Ko - CV

- Quantitative measurement of placental oxygenation using ultrasound-guided diffuse optical spectroscopy
- Cross-validation of two-layer diffuse optical analysis of cerebral hemodynamics with MRI perfusion imaging in children undergoing palliation for single ventricle cardiac physiologies

Aug '11 – Jul '12 Univ. of California, SF – Dept. of Bioengineering (San Francisco, CA) *Masters Student*

Product development and translation of novel continuous renal replacement therapy (CRRT) from bench-top to intensive care. Performed market and stakeholder analysis, user needs assessment, decision and cost effectiveness analysis (DCEA), experimental design and prototyping, and regulatory and commercialization strategy.

Sep '09 – Aug '11 MIT Lincoln Labs – Bio. and Chem. Defense Systems (Lexington, MA) *Assistant Technical Staff*

- Sensors and controls automation for optical characterization of aerosolized Biosafety Level 3 pathogens
- Touch-screen graphical user interface design for a DNA profiling system
- Field deployment of sensors, user-interface controls, database management, and network communications for a biological and chemical maritime cargo container screening system

Jun '06 – Sep '09 Princeton University – (NSF-ERC) Mid-IR Tech. for Health & Environment (Princeton, NJ) *Research Staff*

- Quantum cascade laser (QCL)-based sensor systems for (1) CO₂ detection in a biomimetic polymer matrix modeling human skin, and (2) portable quartz-enhanced, photo-acoustic spectroscopy
- LabVIEW-automated light-intensity-voltage (LIV) characterization systems for QCLs

Sep '08 – Jun '09 Princeton University – Dept. of Mechanical Engineering (Princeton, NJ) *Student Research*

Biomimetic nanosensor array development employing peptides (discovered using combinatorial mutagenic peptide engineering) bound to nanowire arrays for highly specific biochemical sensing

Jun '08 – Aug '08 Vorbeck Materials (Jessup, MD) *R&D Intern*

R&D, cost-benefit and market analysis on graphene-based conductive polymer inks and printing solutions

Jun '07 – Aug '07 Scuola Normale Superiore – Ntl. Enterprise for nanoScience and nanoTech. (Pisa, Italy) *Student Research*

THz optoelectronic materials and device design, fabrication, and characterization (*NSF-IREE Grantee*)

- Dec '04 - Aug '05 Indiana State University – Dept. of Life Sciences (Terre Haute, IN) *Independent Study*
Investigation of clutch sex ratio pattern dynamics in the white-throated sparrow through analysis of 300+ nestling DNA samples collected over 5 years. Trivers-Willard and Fischer's hypothesis were tested. (*Intel Int'l Science Fair – 1st Prize*)
- Sep '03 - Aug '05 Rose-Hulman Inst. of Tech. – Dept. of Elec. and Comp. Eng. (Terre Haute, IN) *Independent Study*
Capacitance-based home security system design, construction and validation. (*Davidson Fellow Laureate – Technology*)
- Jun '02 - Dec '03 Indiana Univ.-Purdue Univ. in Indianapolis – Dept. of Applied Math (Indianapolis, IN) *Independent Study*
Algorithm development mapping discontinuous dynamical systems into continuous space to assist discrete data analysis

PUBLICATIONS

(*in review*) Lynch JM, Mavroudis CD, **Ko T**, Boorady TW, Devarajan M, Jacobwitz M, Busch DR, Mensah-Brown K, Nicolson SC, Montenegro LM, Gaynor JW, Yodh AG, Licht DJ. Effect of ongoing cerebral oxygen metabolism during DHCA on post-operative brain injury. *J Thorac Cardiovasc Surg*. Submitted Nov 2020.

(*in review*) Flanders TM, Lang S-S, **Ko TS**, Andersen KN, Flibotte JJ, Licht DJ, Tasian GE, Yodh AG, Kennedy BC, Storm PB, White BR, Heuer GG, Baker WB. Non-invasive optical detection of intracranial pressure and cerebral perfusion changes in neonatal hydrocephalus. *Neurology*. Submitted Oct 2020.

(*in press*) Padawer-Curry JA, Volk LE, Mavroudis CD, **Ko TS**, Morano VC, Busch DR, Rosenthal TM, Melchior RW, Shade BC, Schiavo KL, Boorady TW, Schmidt AL, Andersen KN, Breimann JS, Jahnvi J, Mensah-Brown KG, Yodh AG, Mascio CE, Kilbaugh TJ, Licht DJ, White BR, Baker WB. Differential Effects of Deep Hypothermic Circulatory Arrest, Selective Cerebral Perfusion, and Cardiopulmonary Bypass on Cerebral Autoregulation in Neonatal Swine. *Pediatr Res*. Submitted Nov 2020.

Ko TS, Mavroudis CD, Morgan RW, Marquez AM, Baker WM, Boorady T, Landis WP, Nadkarni VM, Berg RA, Sutton RM, Yodh AG, Licht DJ, Guo W, Kilbaugh TJ. Non-invasive diffuse optical neuromonitoring during cardiopulmonary resuscitation predicts return of spontaneous circulation. *Sci Rep*. 2021;3828:1–14. PMID: 33589662; PMCID: PMC7884428.

Mavroudis CD, **Ko T**, Volk LE, Smood B, Delso N, Hallowell T, Morgan RW, Lynch JM, Davarajan M, Boorady T, Melchior RW, Rosenthal TM, Licht DJ, Chen JM, Gaynor JW, Mascio CE, Kilbaugh TJ. Does supply meet demand? A comparison of perfusion strategies on cerebral metabolism in a neonatal swine model. *J Thorac Cardiovasc Surg*. 2021. PMID: 33485668.

Kirschen MP, Morgan RW, Majmudar T, Landis WP, **Ko T**, Balu R, Balasubramanian S, Topjian A, Sutton RM, Berg RA, Kilbaugh TJ. The association between early impairment in cerebral autoregulation and outcome in a pediatric swine model of cardiac arrest. *Resusc Plus*. 2020;4(September 2020):100051.

White BR, Padawer-Curry JA, **Ko T**, Baker W, Breimann A, Cohen AS, Licht DJ, Yodh AG. Wavelength censoring for spectroscopy in optical functional neuroimaging. *Phys Med Biol*. 2020; PMID: 33326946.

Slovis J, Morgan R, Landis W, Roberts AL, Mavroudis C, Lin Y, **Ko T**, Nadkarni V, Berg RA, Sutton R, Kilbaugh TJ. The physiologic response to rescue therapy with vasopressin versus epinephrine during experimental pediatric cardiac arrest. *Resusc Plus*. 2020;4(August):100050.

Volk LE, Mavroudis CD, **Ko T**, Hallowell T, Delso N, Roberts AL, Starr J, Landis W, Lin Y, Hefti M, Morgan RW, Melchior RW, Rosenthal TM, Chappell A, Fisher D, Dreher M, Licht DJ, Chen J, Gaynor JW, Mascio CE, Kilbaugh TJ. Increased cerebral mitochondrial dysfunction and reactive oxygen species with cardiopulmonary bypass. *Eur J Cardio-Thoracic Surg*. 2020. PMID: 33367535.

Mavroudis CD, **Ko TS**, Morgan RW, Volk LE, Landis WP, Smood B, Xiao R, Hefti M, Boorady TW, Marquez A, Karlsson M, Licht DJ, Nadkarni VM, Berg RA, Sutton RM, Kilbaugh TJ. Epinephrine's effects on cerebrovascular and systemic hemodynamics during cardiopulmonary resuscitation. *Crit Care*. 2020 Sep 29;24(1):583. PMID: 32993753; PMCID: PMC7522922.

Busch DR, Baker WB, Mavroudis CD, **Ko TS**, Lynch JM, McCarthy AL, DuPont-Thibodeau G, Buckley EM, Jacobowitz M, Boorady TW, Mensah-Brown K, Connelly JT, Yodh AG, Kilbaugh TJ, Licht DJ. Noninvasive optical measurement of microvascular cerebral hemodynamics and autoregulation in the neonatal ECMO patient. *Pediatr Res*. 2020. PMID: 32172282; PMCID: PMC7492409.

Marquez AM, Morgan RW, **Ko T**, Landis WP, Hefti MM, Mavroudis CD, McManus MJ, Karlsson M, Starr J, Roberts AL, Lin Y, Nadkarni V, Licht DJ, Berg RA, Sutton RM, Kilbaugh TJ. Oxygen Exposure During Cardiopulmonary Resuscitation Is Associated With Cerebral Oxidative Injury in a Randomized, Blinded, Controlled, Preclinical Trial. *J Am Heart Assoc*. 2020;9(9):e015032. PMID: 32321350; PMCID: PMC7428577.

Lautz AJ, Morgan RW, Karlsson M, Mavroudis CD, **Ko TS**, Licht DJ, Nadkarni VM, Berg RS, Sutton RM, Kilbaugh TJ. Hemodynamic-directed Cardiopulmonary Resuscitation Improves Survival with Favorable Neurologic Outcome and Mitochondrial Function in the Heart and Brain. *Crit Care Med*. 2019 Mar;47(3):e241-e249. PMCID: PMC6561502.

Ko TS, "Diffuse Optical Cerebral Diagnostics For Real-Time Guidance During Pediatric Surgery And Resuscitation" (2018). Penn Dissertations. 3138. <https://repository.upenn.edu/edissertations/3138>

Ko TS, Mavroudis CD, Baker WB, Morano VC, Mensah-Brown K, Boorady TW, Schmidt AL, Lynch JM, Busch DR, Gentile J, Bratinov G, Lin Y, Jeong S, Melchior RW, Rosenthal TM, Shade BC, Schiavo KL, Xiao R, Gaynor JW, Yodh AG, Kilbaugh TJ, Licht DJ. Non-invasive optical neuromonitoring of the temperature-dependence of cerebral oxygen metabolism during deep hypothermic cardiopulmonary bypass in neonatal swine. *J Cereb Blood Flow Metab*. 2020 Jan;40(1):187–203. PMCID: PMC6928559.

Mavroudis CD, Karlsson M, **Ko T**, Hefti M, Gentile JI, Morgan RW, Plyler R, Mensah-Brown KG, Boorady TW, Melchior RW, Rosenthal TM, Shade BC, Schiavo KL, Nicolson SC, Spray TL, Sutton RM, Berg RA, Licht DJ, Gaynor JW, Kilbaugh TJ. Cerebral mitochondrial dysfunction associated with deep hypothermic circulatory arrest in neonatal swine. *Eur J Cardio-Thoracic Surg*. 2018 Jan 15;54(1):162–168. PMCID: PMC7448940.

Mavroudis CD, Mensah-Brown KG, **Ko TS**, Boorady TW, Massey SL, Abend NS, Nicolson SC, Morgan RW, Mascio CE, Gaynor JW, Kilbaugh TJ, Licht DJ. Electroencephalographic Response to Deep Hypothermic Circulatory Arrest in Neonatal Swine and Humans. *Ann Thorac Surg*. The Society of Thoracic Surgeons; 2018;106(6):1841–1846. PMCID: PMC6330195.

Lynch JM, **Ko T**, Busch DR, Newland JJ, Winters ME, Mensah-Brown K, Boorady TW, Xiao R, Nicolson SC, Montenegro LM, Gaynor JW, Spray TL, Yodh AG, Naim MY, Licht DJ. Preoperative cerebral hemodynamics

from birth to surgery in neonates with critical congenital heart disease. *J Thorac Cardiovasc Surg*. 2018;156(4):1657–1664. PMID: 29859676

Wang D, Parthasarathy AB, Baker WB, Gannon K, Kavuri V, **Ko T**, Schenkel S, Li Z, Li Z, Mullen MT, Detre JA, Yodh AG. Fast blood flow monitoring in deep tissues with real-time software correlators. *Biomed Opt Express*. 2016;7(3):776. PMID: 27231588

Busch DR, Lynch JM, Winters ME, McCarthy AL, Newland JJ, **Ko T**, Cornaglia MA, Radcliffe J, McDonough JM, Samuel J, others. Cerebral blood flow response to hypercapnia in children with obstructive sleep apnea syndrome. *Sleep*. 2016;39(1):209–216. PMID: 26414896

McCarthy AL, Winters ME, Busch DR, González-Giraldo E, **Ko TS**, Lynch JM, Schwab PJ, Xiao R, Buckley EM, Vossough A, Licht DJ. Scoring system for periventricular leukomalacia in infants with congenital heart disease. *Pediatr Res*. 2015;78(3):304–309. PMID: 24655651

Baker WB, Parthasarathy AB, **Ko TS**, Busch DR, Abramson K, Tzeng S-Y, Mesquita RC, Durduran T, Greenberg JH, Kung DK, Yodh AG. Pressure modulation algorithm to separate cerebral hemodynamic signals from extracerebral artifacts. *Neurophotonics*. 2015;2(3):035004. PMID: 26301255

Li Z, Baker WB, Parthasarathy AB, **Ko TS**, Wang D, Schenkel S, Durduran T, Li G, Yodh AG. Calibration of diffuse correlation spectroscopy blood flow index with venous-occlusion diffuse optical spectroscopy in skeletal muscle. *J Biomed Opt*. 2015;20(12):125005. PMID: 26720870

Howard SS, Liu Z, Wasserman D, Hoffman AJ, **Ko TS**, Gmachl CF. High-performance quantum cascade lasers: optimized design through waveguide and thermal modeling. *IEEE J Sel Top Quantum Electron*. 2007;13(5):1054–1064.

PATENTS

“Non-Invasive Cerebral Monitoring and Cerebral Metric-Based Guidance for Medical Procedures,” United States Patent and Trademark Office, Application No. 62/930,699. Provisional application filed November 5, 2019.

CONFERENCES & INVITED PRESENTATIONS

- Mar '21 **Ko TS**, Mavroudis CD, Lynch JM, Melchior RW, Rosenthal TM, Starr JP, Boorady TW, Schmidt AL, Davarajan M, Yodh AG, Gaynor JW, Baker WB, Kilbaugh TJ, Licht DJ. Variability in Cerebral Oxygen Metabolism at Deep Hypothermia and following Deep Hypothermic Circulatory Arrest. Single Ventricle Investigator Meeting 2021. ([video](#))
- Mar '21 **Ko TS**, Benson EJ, Slovis JC, Volk LE, Mavroudis CD, Morgan RW, Breimann J, Jahnavi J, Starr JP, Landis WP, Hallowell T, Delso N, Andersen KN, Padawer-Curry JA, Roberts AL, Lin Y, Graham K, Melchior RW, Yodh AG, Berg RA, Baker WB, Kilbaugh TJ, Licht DJ. Correlation of Non-Invasive Diffuse Optical Measurements of Cerebral Hemodynamics and Cerebral Microdialysis during Extracorporeal Membrane Oxygenation. SPIE Photonics West 2021. San Francisco, CA; 2021. ([video](#))
- Feb '21 Kirschen MP, Morgan RW, Majmudar T, Landis WP, **Ko T**, Balu R, Balasubramanian S, Topjian A, Sutton RM, Berg RA, Kilbaugh TJ. Association between cerebral autoregulation and outcome in swine model of pediatric cardiac arrest. 50th Crit Care Congr.
- Nov '20 **Ko TS**, Slovis J, Volk L, Mavroudis CD, Morgan RW, Breimann J, Starr JP, Landis WP, Benson E, Hallowell T, Delso N, Andersen K, Roberts A, Jahnavi J, Curry JP, Lin Y, Graham K, Berg

- RA, Baker WB, Licht DJ, Kilbaugh TJ. Non-invasive Measurement of Cerebral Tissue Oxygen Extraction Fraction is Correlated with Microdialysis Brain Injury Biomarkers During Extracorporeal Cardiopulmonary Resuscitation. AHA Resusc Sci Symp 2020. 2020.
- Nov '20 Breimann J, **Ko T**, Jahnavi J, Xiao R, White BR, Mille FK, Baker WB, Licht DJ, Lynch JM. Effects of Balloon Atrial Septostomy on Cerebral Oxygen Metabolism and White Matter Injury in Neonates with Transposition of the Great Arteries. Pediatr Card Intensive Care Soc 16th Annu Int Meet. 2020.
- Sep '20 Breimann J, Slovis JC, **Ko TS**, Volk LE, Morgan RW, Melchior RW, Jahnavi J, Andersen KN, Padawer-Curry JA, Hallowell T, Delso N, Roberts AL, Landis WP, Lin Y, Graham K, Baker WB, Licht DJ, Kilbaugh TJ. Cerebral Hemodynamic Response following Extracorporeal Cardiopulmonary Resuscitation. 31st Annu ELSO Virtual Conf. 2020.
- Apr '20 **Ko TS**, Mavroudis CD, Baker WB, Boorady TW, Morano VC, Lin Y, Padawer-Curry JA, Devarajan M, Roberts AL, Landis WP, Andersen KN, Schmidt AL, Gentile J, Melchior RW, Yodh AG, Gaynor JW, Kilbaugh TJ, Licht DJ. Optical Quantification of Cerebral Hemodynamics During Deep Hypothermic Cardiopulmonary Bypass with Selective Cerebral Perfusion. OSA Biophotonics Congress: Biomedical Optics 2020.
- Apr '20 Wang L, Schwartz N, Cochran JM, **Ko T**, Baker W, He L, Abramson K, Yodh A. Noninvasive Measurement of Placental Hemodynamics with Ultrasound-guided FD-Diffuse Optical Spectroscopy. OSA Biophotonics Congress: Biomedical Optics 2020.
- Apr '20 Baker WB, Heye P, Heye K, **Ko TS**, Lin Y, Roberts AL, Delso N, Hallowell T, Andersen KN, Padawer-curry J, Taraska NG, White BR, Yodh AG, Licht DJ, Kilbaugh TJ. Diffuse Optical Biomarkers of Elevated Intracranial Pressure in Hydrocephalus. OSA Biophotonics Congress: Biomedical Optics 2020.
- Apr '20 Benson EJ, Volk LE, **Ko TS**, Belbegra S, Baker WB, Padawer-Curry JA, Andersen KN, Schmidt AL, Lin Y, Roberts AL, Delso N, Landis WP, Hallowell T, Kilbaugh TJ, Licht DJ, Yodh AG. Oxygen Saturation and Blood Flow Measured as a Function of Time During Cardiopulmonary Bypass. OSA Biophotonics Congress: Biomedical Optics 2020.
- Feb '20 Padawer-Curry J, Volk L, Morano V, **Ko T**, Mavroudis C, Baker W, Busch D, White B, Andersen K, Rosenthal T, Melchior R, Shade B, Boorady T, Kellie S, Yodh A, Gaynor W, Kilbaugh T, Licht D. Cerebral autoregulation following deep hypothermia and circulatory arrest in neonatal swine. Society of Critical Care Medicine, Critical Care Congress 2020. Orlando, FL.
- Jan '20 (*Invited Exhibitor*) Neurometabolic Monitor: Next Generation Resuscitation. Arab Health Exhibition and Congress 2020. Dubai, United Arab Emirates.
- Nov '19 (*Invited Panelist*) "Frontiers of Laboratory ECPR, Metabolic therapies, and Neuromonitoring" Session. Global Alliance for Pediatric Resuscitation Conference. Children's Hospital of Philadelphia, Philadelphia, PA.
- Jul '19 **Ko TS**, Mavroudis CD, Morgan RW, Marquez AM, Nadkarni VM, Berg RA, Sutton RM, Yodh AG, Kilbaugh TJ, Licht DJ. Non-invasive diffuse optical neuromonitoring predicts return of spontaneous circulation during cpr following asphyxial cardiac arrest in pediatric swine. BRAIN Int Symp Cereb Blood Flow, Metab Funct. 2019. Yokohama, JP.
- Jul '19 Lynch JM, **Ko T**, Mavroudis CD, Mensah-Brown K, Busch DR, Nicolson SC, Gaynor JW, Yodh AG, Licht DJ. Over-estimation of cerebral oxygen saturation by commercial oximeter during

deep hypothermic circulatory arrest. BRAIN Int Symp Cereb Blood Flow, Metab Funct. 2019. Yokohama, JP.

- Nov '18 **Ko TS**, Guo W, Mavroudis CD, Morgan RW, Baker WM, Boorady T, Marquez AM, Landis WP, Nadkarni VM, Berg RA, Sutton RM, Yodh AG, Licht DJ, Kilbaugh TJ. Selection of Optimal Predictor and Critical Thresholds for Return of Spontaneous Circulation Using Non-Invasive Frequency-Domain Diffuse Optical Spectroscopy During Cardiopulmonary Resuscitation. Am Hear Assoc Resusc Sci Symp. 2018. Chicago, IL.
- Oct '18 (*Invited Speaker*) **Ko TS**. Non-invasive intraoperative monitoring of cerebral oxygen metabolism during deep hypothermia and circulatory arrest. Pennsylvania State Perfus Soc. 2018. King of Prussia, PA.
- May '18 Morano VC, **Ko TS**, Mavroudis CD, Busch DR, Baker WB, Rosenthal TM, Melchior RW, Shade BC, Schiavo KL, Gentile JI, Boorady TW, Mensah-Brown KG, Yodh AG, Gaynor JW, Kilbaugh TJ, Licht DJ. Impaired Cerebral Autoregulation Following Deep Hypothermia with and without Circulatory Arrest in Neonatal Swine. Pediatr Acad Soc Meet. 2018. Toronto, CA.
- Apr '18 **Ko TS**, Mavroudis CD, Boorady TW, Mensah-Brown KG, Morgan RW, Lautz A, Bratinov G, Lin Y, Jeong S, Nadkarni VM, Berg RA, Sutton RM, Yodh AG, Kilbaugh TJ, Licht DJ. Prediction of Return of Spontaneous Circulation During Cardiopulmonary Resuscitation using Frequency-Domain Diffuse Optical Spectroscopy in a Pediatric Swine Model of Asphyxial Cardiac Arrest. OSA Biophotonics Congr. 2018. Hollywood, FL.
- Apr '18 **Ko TS**, Mavroudis CD, Baker WB, Morano V, Mensah-Brown KG, Boorady TW, Lynch JM, Busch DR, Schmidt AL, Gentile JI, Bratinov G, Lin Y, Jeong S, Melchior RW, Rosenthal TM, Schiavo KL, Shade BC, Xiao R, Yodh AG, Kilbaugh TJ, Licht DJ. Non-Invasive Diffuse Optical Quantification of Changes in Cerebral Oxygen Metabolism Following Deep Hypothermia and Circulatory Arrest in a Neonatal Swine Model. OSA Biophotonics Congr. 2018. Hollywood, FL.
- Apr '18 Wang L, **Ko T**, He L, Kavuri VC, Parthasarathy AB, Baker W, Schwartz N, Yodh AG. Optical Quantification of Placenta Oxygenation with Ultrasound Integrated Frequency-Domain NIRS. OSA Biophotonics Congr. 2018. Hollywood, FL.
- Feb '18 **Ko TS**, Mavroudis CD, Baker WB, Mensah-Brown KG, Schmidt AL, Morano V, Bratinov G, Lin Y, Jeong S, Melchior RW, Rosenthal TM, Schiavo K, Busch DR, Lynch JM, Yodh AG, Licht DJ, Kilbaugh TJ. Validation of diffuse optical spectroscopic measurement of cerebral oxygen metabolism in a piglet model of deep hypothermic circulatory arrest (DHCA). Cardiology. 2018. Scottsdale, AZ.
- Feb '18 **Ko TS**, Mavroudis CD, Boorady TW, Mensah-Brown KG, Morgan RW, Lautz A, Karlsson M, Bratinov G, Berg RA, Yodh AG, Sutton RM, Kilbaugh TJ, Licht DJ. Validation of noninvasive measurements of cerebral blood flow and oxygenation in a pediatric swine model of cardiac arrest and cardiopulmonary resuscitation. Cardiology. 2018. Scottsdale, AZ.
- Jan '18 Mavroudis CD, Mensah-Brown KG, **Ko TS**, Gentile JI, Spray TL, Nicolson SC, Kilbaugh TJ, Gaynor JW, Licht DJ. Electroencephalogram Activity During Deep Hypothermia and Circulatory Arrest in Neonatal Swine and Humans: a Comparative Study. 54th Annu Meet Soc Thorac Surg. 2018. Fort Lauderdale, FL.
- Oct '17 Mavroudis CD, Karlsson M, Gentile JI, **Ko TS**, Plyer R, Gaynor JW, Licht DJ, Kilbaugh TJ. Deep Hypothermic Circulatory Arrest Versus Cold Cerebral Perfusion and Their Effects on

Cerebral Mitochondrial Bioenergetics in a Neonatal Swine Model. 31st Annu Meet Eur Assoc Cardiothorac Surg. 2017. Vienna, Austria.

- Jul '17 **Ko TS**, He L, Wang L, Kavuri VC, Parthasarathy AB, Cochran J, Seigal J, Baker WB, Busch DR, Zubkov L, Yodh AG, Schwartz N. Optical Quantification of Placental Tissue Oxygenation with Near-Infrared Spectroscopy. NIH U01 Hum Placenta Proj. 2017. Bethesda, MD.
- Jun '17 Jacobowitz M, **Ko TS**, McCarthy AL, Mensah-Brown KG, Boorady TW, Busch DR, Mavroudis CD, Xiao R, Vossough A, Licht DJ. Neurological Injury Does Not Predict Feeding Ability at Discharge in Neonates with Critical Congenital Heart Disease. 6th Annu Card Neurodev Symp. 2017. Ann Arbor, MI.
- Apr '17 Busch DR, **Ko TS**, Boorady TW, Newland JJ, Mensah-Brown KG, Lynch JM, Winters ME, Mccarthy AL, Beslow L, Buckley EM, Durduran T. Manipulation of cerebral blood flow through postural changes in pediatric stroke. 28th Int Symp Cereb Blood Flow, Metab Funct. 2017. Berlin, Germany.
- Apr '17 Lynch JM, Mavroudis CD, **Ko TS**, Mensah-Brown KG, Busch DR, Nicolson SC, Montenegro LM, Fuller SM, Spray TL, Gaynor JW, Yodh AG, Naim MY, Licht DJ. Decreasing cerebral tissue oxygen saturation during deep hypothermic circulatory arrest. 28th Int Symp Cereb Blood Flow, Metab Funct. 2017. Berlin, Germany.
- Apr '17 Mavroudis C, **Ko T**, Boorady T, Mensah-Brown K, Morgan R, Lautz A, Karlsson M, Bratinov G, Berg R, Yodh A, others. Characterization of cerebral hemodynamics following return of spontaneous circulation (ROSC) in a porcine model of pediatric asphyxial cardiac arrest and resuscitation. Int Symp Cereb Blood Flow, Metab Funct. 2017. Berlin, Germany.
- Apr '17 **Ko TS**, Mavroudis CD, Boorady TW, Mensah-Brown KG, Morgan RW, Lautz A, Karlsson M, Bratinov G, Berg RA, Yodh AG, Sutton RM, Licht DJ, Kilbaugh TJ. Validation of noninvasive measurements of cerebral blood flow and oxygenation in a pediatric swine model of cardiac arrest and cardiopulmonary resuscitation. 28th Int Symp Cereb Blood Flow, Metab Funct. 2017. Berlin, Germany.
- Jan '17 **Ko TS**, Mavroudis CD, Baker WB, Mensah-Brown KG, Schmidt AL, Morano V, Bratinov G, Lin Y, Jeong S, Melchior RW, Rosenthal TM, Schiavo K, Busch DR, Lynch JM, Yodh AG, Licht DJ, Kilbaugh TJ. Validation of diffuse optical spectroscopic measurement of cerebral oxygen metabolism in a piglet model of deep hypothermic circulatory arrest (DHCA). SPIE Photonics West. 2017. San Francisco, CA.
- Jan '17 **Ko TS**, He L, Kavuri VC, Parthasarathy AB, Morano VC, Cochran J, Baker WB, Seigal J, Yodh AG, Licht DJ, Schwartz N. Quantifying placental oxygenation using ultrasound-guided frequency-domain near-infrared spectroscopy (FD-NIRS). 2017 Soc Matern Fetal Med Annu Meet. 2017. Las Vegas, NV.
- Apr '16 Lynch JM, **Ko T**, Newland JJ, Winters ME, Busch DR, Nicolson SC, Montenegro LM, Yodh AG, Licht DJ. Effect of anesthesia on cerebral oxygenation and blood flow in neonates with critical congenital heart disease. Biomed Opt 2016, Optical Society of America. Hollywood, FL.
- Sep '15 **Ko TS**, Lynch JM, Newland JJ, Winters ME, Hudson E, Busch DR, McCarthy AL, Xiao R, Nicolson SC, Montenegro LM, Fuller SM, Gaynor JW, Spray TL, Naim MY, Yodh AG, Licht DJ. Development of regional cerebral hemodynamics in neonates with critical congenital heart disease. SPIE/NIH Biophotonics from Bench to Bedside Conf. 2015. Bethesda, MD.

- Jun '15 **Ko TS**, Lynch JM, Winters ME, Busch DR, Mccarthy AL, Xiao R, Nicolson SC, Montenegro LM, Fuller SM, Gaynor JW, Spray TL, Naim MY, Yodh AG, Licht DJ. Development of regional cerebral hemodynamics in neonates with critical congenital heart disease. XXVIIth Int Symp Cereb Blood Flow, Metab Funct. 2015. Vancouver, CA.
- Oct '14 Lynch JM, Winters ME, Busch DR, **Ko TS**, McCarthy AL, Xiao R, Nicolson SC, Montenegro LM, Fuller S, Gaynor JW, Spray TL, Yodh AG, Licht DJ, Naim MY. Post-operative regional cerebral hemodynamics in infants with critical congenital heart disease. fNIRS. 2014. Montreal, CA.
- July '12 **Ko TS**, Bao J, Soler P, Heller JA, Kant R, Hiemstra DM, Roy S. Sustainable-Mode Artificial Kidney (SMart). 2012 UCSF-UCB Masters Transl Med Capstone. 2012. San Francisco, CA.
- May '10 Michel APM, Chen TP, **Ko TS**, Raj N V, Inyang ME, Bosworth BT, Escarra MD, Gmachl CF. Development of a quantum cascade laser-based sensor for non-invasive CO₂ monitoring. CLEO/QELS Conf. 2010. Baltimore, MD.
- Aug '09 **Ko TS**, Raj N, Escarra M, Michel AP, Gmachl CF. Design and development of a quantum cascade laser CO₂ sensor system for detection in a polymer matrix. NSF-ERC MIRTHE Summer Work. 2009. New York, NY.
- Nov '07 **Ko T**, Green R, Barate D, Xu JH, Annapara A, Tredicucci A. Investigating THZ Optoelectronic Devices. NSF-IREE Conf. 2007.
- May '07 **Ko TS**, Liu Z, Gmachl CF. Pulsed High Duty-Cycle Operation of $\lambda \sim 8\mu\text{m}$ Quantum Cascade Lasers. CLEO/QELS Conf. 2007. Baltimore, MD.
- Aug '06 **Ko T**, Korody M, Tuttle EM, Gonser R. Testing Adaptive Models of Sex Allocation in a Polymorphic Species. Anim Behav Soc 2006 Annu Meet. 2006. Snowbird, UT.

GRANTS & AWARDS

2020	Resuscitation Science Symposium (ReSS) Young Investigator Award	<i>Postdoctoral Trainee</i>
2019-2022	Children's Hospital of Philadelphia (CHOP) Frontier Program "Biomedical Optical Devices to Monitor Cerebral Health"	<i>Co-Investigator</i>
2019-2022	CHOP Pediatric Cardiology T32 Postdoctoral Training Award (NIH NHLBI T32-HL007915) "Real-Time Guidance of Cardiopulmonary Resuscitation using Non-Invasive Diffuse Optical Measurements of Cerebral Hemodynamics"	<i>Postdoctoral Trainee</i>
2016-2018	Ruth L. Kirschstein Predoctoral Individual National Research Service Award (NIH NICHD F31-HD085731) "Functional Diffuse Optical Measurements of Psychomotor Function in Neonates with Hypoplastic Left Heart Syndrome (HLHS)"	<i>Predoctoral Trainee</i>
2014-2015	University of Pennsylvania - University Research Foundation "fDCS of Feeding-Related Psychomotor Delays in Hypoplastic Left Heart and other Single Ventricle CHD"	<i>Predoctoral Trainee</i>

- 2012-2014 **University of Pennsylvania, Department of Bioengineering, Training Program in Biomedical Imaging and Informational Sciences (NIH NIBIB T32-EB009384)** *Predoctoral Trainee*
“HHMI-NIBIB Interfaces Scholar in Biomedical Imaging”
- 2007 **National Science Foundation International Research and Education in Engineering Grantee** *Undergraduate Student*
- 2005 **Davidson Fellow Laureate in Technology** *High School Student*
“Designing a Capacitance-Based Security System Employing the MC33794 E-Field Sensor Chip”
- 2005 **Intel International Science and Engineering Fair – 1st Grand Prize, Zoology** *High School Student*
“Testing Adaptive Models of Sex Allocation in a Polymorphic Species”

LEADERSHIP, TEACHING & VOLUNTEER EXPERIENCES

- 2017-Present **Advances in Biomedical Optics (ABO) Seminar Series Organizer**
Invited speakers, arranged travel logistics, and organized on-campus programming
- Nov 12, 2015 **University of Pennsylvania LGBT Center SafeSpace Training Volunteer**
Panelist in SafeSpace cultural competency training for School of Social Policy and Practice
- Oct 28, 2015 **Nano/Bio Interface Center (NBIC) NanoDemo Educator**
Conducted an interactive heat transfer demonstration for local high school students
- 2014-2015 **Out in Science, Technology, Engineering, and Mathematics (oSTEM) Board Member**
Graduate student liaison with School of Engineering and Applied Science (SEAS) Diversity and Inclusion staff and administration
- 2014-2015 **Washington West Health Clinic Volunteer, STI Testing and Counseling**
- 2013-2014 **University of Pennsylvania Lambda Grads Vice-Chair**
Planned interdisciplinary programming and services for the graduate and professional LGBTQ community
- Spring 2013 **Student Educator with the Perelman School of Medicine Pipeline Program**
Co-taught after-school 3-week unit focusing on gastrointestinal health/disease for high school students

2012-2013 **Co-Chair of the Perelman School of Medicine LGBT People in Medicine (LGBTPM+) Student Group**

Organized medical seminars addressing LGBTQ health disparities; revised PSOM admissions statement to encompass inclusive terminology; solicited and published inaugural Outlist of faculty, housestaff, and student; initiated social media presence and redesigned group webpage.

Fall 2011 **UC Berkeley Graduate Student Instructor: Principles of Synthetic Biology (BioE 190D)**

Conducted homework help session; graded assignments, exams and term projects

2007-2009 **Center on Mid-IR Tech for Health and the Environment (MIRTHE), Student Education Outreach Officer**

2006-2008 **Princeton University IEEE Student Chapter, President**

PEER REVIEW – JOURNALS

Nov '20 Journal of Biomedical Optics

Jun '20 Biomedical Optics Express

May '20 Pediatric Research (Co-Reviewer)

May '20 Journal of Visualized Experiments

Aug '18 Scientific Reports

PROFESSIONAL MEMBERSHIPS

American Heart Association (AHA)	Trainee 2020-2021
International Society for Cerebral Blood Flow and Metabolism (ISCBFM)	Early Career Investigator 2018-2020
Optical Society of America (OSA)	Early Career Investigator 2018-2020, Student 2014-2016
American Society for Engineering Education (ASEE)	Doctoral Student 2017-2018
Society of Photo-Optical Instrumentation Engineers (SPIE)	Student 2017-2018
Institute of Electrical and Electronics Engineers (IEEE)	Student 2006-2009

