Elizabeth Kennedy, PhD

Postdoctoral Fellow Emory University Rollins School of Public Health Gangarosa Department of Environmental Health

emkenn2@emory.edu P: 850.866.0350 F: 404.727.8744 1518 Clifton Road NE mailstop 1518-002-2BB Atlanta, GA 30322

RESEARCH FOCUS

The long-term goal of my research is to examine the *genetic and epigenetic* characteristics that underlie early development, childhood health and disease, and to determine how maternal health modifies those characteristics. I am particularly interested in the first 1,000 days that span the critical window from conception to a child's second birthday, in which maternal health is communicated to offspring first through the *placenta* and then through *breastmilk*. I have expertise in using sophisticated analytical approaches that can be applied to cutting edge -omics data in population studies. By understanding how maternal-child exposures and lifestyle influence children's health, we can inform recommendations, guidelines and early interventions in reducing disease risk over the lifespan and advancing our understanding of the developmental origins of health and disease.

EDUCATION

Post-doctoral Fellowship Emory University, Gangarosa Department of Environmental Health Advisors: Carmen Marsit, PhD & Usha Ramakrishnan, PhD	Atlanta, GA April 2018
Emory University PhD, Genetics and Molecular Biology Advisor: Karen Conneely, PhD, mentor Title: Epigenome-Wide Patterns of DNA Methylation in Radiation Exposure and	Atlanta, GA December 2017 Gene Expression
University of West Florida MS, Biology (Joe Lepo, PhD, mentor)	Pensacola, FL August 2011
University of West Florida BS, Biology/Microbiology, Magna cum laude	Pensacola, FL May 2008
FELLOWSHIPS	
Molecules to Mankind Doctoral Pathway Fellow (BWF ID: 1008188) Role: Graduate Fellow	2014 - 2016
NIGMS Predoctoral Training Program in Genetics (T32GM008490) Role: Graduate Fellow	2013 - 2015
University of West Florida Graduate Student Scholarly and Creative Activity Grant Role: Graduate Fellow	2008 - 2011
HONORS	

Genetics Society of America Early Career Scientist Peer Review Training Program Trainee201919th University of Washington Summer Institute in Statistical Genetics ScholarshipSummer 201418th University of Washington Summer Institute in Statistical Genetics ScholarshipSummer 2013American Society for Microbiology Student Travel AwardMay 2011

April 2018-Curr.

University of West Florida Student Scholar Symposium Graduate Collaborative Award	2010-2011
University of West Florida Department of Biology Outstanding Graduate Student	2009-2010
University of West Florida Graduate Student Scholarly and Creative Activity Grant	2008 - 2011

RESEARCH EXPERIENCE

Postdoctoral Researcher, Emory University

Gangarosa Department of Environmental Health Rollins School of Public Health Advisors: Carmen Marsit & Usha Ramakrishnan

DNA methylation

- Established a relationship between promoter methylation at the transcription factor, *ZNF197 and* placental copper concentration, which is linked to maternal metabolism.
- Collaborated with Dr. Allison Appleton, University at Albany (SUNY), to estimate the role of maternal stress in epigenetic gestational age at birth.
- Collaborated with Pediatric HIV/AIDS Cohort Study (PHACS), Harvard T.H. Chan School of Public Health, to estimate epigenetic ages among youth with perinatally acquired HIV and youth who were perinatally HIV-exposed uninfected

microRNA

- Developed an analytical pipeline to assess the impact of microRNAs in placenta using integrated -omic measures and AI methods.
- Established relationships between placental microRNAs, birth weight, early childhood growth, and maternal factors, like BMI.
- Collaborated with Dr. Carrie Breton's research group at USC to interpret the effects of differential abundance of extracellular microRNAs in maternal plasma, between early and late pregnancy.
- Initiated collaboration with Dr. Alison Paquette, Seattle Children's Hospital, to utilize machine learning techniques to develop the placental microRNA regulatory network.

This work is funded through a K99/R00 Pathway to Independence Award from NICHD and has resulted in 12 manuscripts (four as first-author) including six peer reviewed publications (1–6) in leading journals such as *Epigenetics*.

Doctoral student, Emory University

Aug 2012 – Dec. 2017

Department of Human Genetics Advisor: Karen Conneely

- Characterized genome-wide DNA methylation signatures of gene expression in human blood cells.
- Exhibited that site-specific DNA methylation is capable of associating with cross-chromosome gene transcription.
- Developed database of site-specific CpG to gene relationships in blood cells to aid in Epigenome-wide association study (EWAS) interpretation, as well as a custom UCSC genome browser track to aid in EWAS visualizations.
- Demonstrated that cross-sectional methylation-transcription associations were primarily negative, including in gene bodies. This last finding highlights that the persistent idea that DNA methylation negatively associates with transcription in promoter regions and positively associates with transcription in gene bodies, cannot be assumed in cross-sectional, population-based studies.
- Initiated collaboration with Dr. Paula Vertino (University of Rochester) and led the first EWAS of galactic cosmic radiation in human cell culture, which found that radiation-specific epigenetic changes could distinguish tumor from normal cells in both lung adenocarcinoma and lung squamous cell carcinoma.

• Collaborated with on research characterizing epigenetic patterns that relate with exposure to polybrominated biphenyl (PBB), gestational epigenetic age (Knight, *Genomics*), air pollution and aging (Peters, *Nature Communications*).

This work was funded by a competitive appointment to a T32, and a fellowship in the Emory Molecules to Mankind program, funded by the Burroughs Wellcome Fund and resulted in nine peer-reviewed publications (three as first author; 7–15), as well as the creation of a publicly available resource to enable use of methylation-transcription signatures available as annotation for other EWASs.

GRANT SUPPORT

Apr 2021 – Mar 2026 Placental and breastmilk microRNAs in relation to early-life growth and metabolism Principal Investigator: Elizabeth Kennedy Goehring, PhD Emory University NIH NICHD K99/R00 Pathway to Independence Award, K99HD104991 \$1,008,981

PUBLICATIONS

Published Peer-Reviewed Journals

- Tian F-Y, Kennedy EM, Hermetz K, Burt A, Everson TM, Punshon T, Jackson BP, Hao K, Chen J, Karagas MR, Koestler DC, Marsit C. Selenium-associated differentially expressed microRNAs and their targeted mRNAs across the placental genome in two U.S. birth cohorts. Epigenetics. 2021 Nov 16;1–12. PMID: 34784848
- 2. Shiau S, Brummel SS, **Kennedy EM**, Hermetz K, Spector SA, Williams PL, Kacanek D, Smith R, Drury SS, Agwu A, Ellis A, Patel K, Seage GR, Van Dyke RB, Marsit CJ, Pediatric HIV/AIDS Cohort Study (PHACS). Longitudinal changes in epigenetic age in youth with perinatally acquired HIV and youth who are perinatally HIV-exposed uninfected. AIDS. 2021 Apr 1;35(5):811–819. PMCID: PMC7969428
- 3. Howe CG, Foley HB, **Kennedy EM**, Eckel SP, Chavez TA, Faham D, Grubbs BH, Al-Marayati L, Lerner D, Suglia S, Bastain TM, Marsit CJ, Breton CV. Extracellular vesicle microRNA in early versus late pregnancy with birth outcomes in the MADRES study. Epigenetics. 2021 Mar 18;1–17. PMID: 33734019
- 4. Kennedy EM, Hermetz K, Burt A, Everson TM, Deyssenroth M, Hao K, Chen J, Karagas MR, Pei D, Koestler DC, Marsit CJ. Placental microRNA expression associates with birthweight through control of adipokines: results from two independent cohorts. Epigenetics. 2020 Oct 4;1–13. PMID: 33016211
- Kennedy E, Everson TM, Punshon T, Jackson BP, Hao K, Lambertini L, Chen J, Karagas MR, Marsit CJ. Copper associates with differential methylation in placentae from two US birth cohorts. Epigenetics. 2020 Mar;15(3):215–230. PMCID: PMC7028322
- Clarkson-Townsend DA*, Kennedy E, Everson TM, Deyssenroth MA, Burt AA, Hao K, Chen J, Pardue MT, Marsit CJ. Seasonally variant gene expression in full-term human placenta. FASEB J. 2020 Aug;34(8):10431–10442. PMCID: PMC7688493
- Gondalia R, Baldassari A, Holliday KM, Justice AE, Méndez-Giráldez R, Stewart JD, Liao D, Yanosky JD, Brennan KJM, Engel SM, Jordahl KM, Kennedy E, Ward-Caviness CK, Wolf K, Waldenberger M, Cyrys J, Peters A, Bhatti P, Horvath S, Assimes TL, Pankow JS, Demerath EW, Guan W, Fornage M, Bressler J, North KE, Conneely KN, Li Y, Hou L, Baccarelli AA, Whitsel EA. Methylome-wide association study provides evidence of particulate matter air pollution-associated DNA methylation. Environ Int. 2019;132:104723. PMCID: PMC6754789
- 8. Curtis SW, Cobb DO, Kilaru V, Terrell ML, **Kennedy EM**, Marder ME, Barr DB, Marsit CJ, Marcus M, Conneely KN, Smith AK. Exposure to polybrominated biphenyl (PBB) associates with genome-wide DNA methylation differences in peripheral blood. Epigenetics. 2019 Jan 24;0(0):1–15. PMID: 30676242
- 9. Knight AK, Park HJ, Hausman DB, Fleming JM, Bland VL, Rosa G, **Kennedy EM**, Caudill MA, Malysheva O, Kauwell GPA, Sokolow A, Fisher S, Smith AK, Bailey LB. Association between one-carbon

metabolism indices and DNA methylation status in maternal and cord blood. Sci Rep. 2018 Nov 15;8(1):16873. PMCID: PMC6237996

- Kennedy EM, Goehring GN, Nichols MH, Robins C, Mehta D, Klengel T, Eskin E, Smith AK, Conneely KN. An integrated -omics analysis of the epigenetic landscape of gene expression in human blood cells. BMC Genomics. 2018 Jun 19;19(1):476. PMID: 29914364
- 11. Kennedy EM, Powell DR, Li Z, Bell JSK, Barwick BG, Feng H, McCrary MR, Dwivedi B, Kowalski J, Dynan WS, Conneely KN, Vertino PM. Galactic Cosmic Radiation Induces Persistent Epigenome Alterations Relevant to Human Lung Cancer. Sci Rep. 2018 Apr 30;8. PMCID: PMC5928241
- 12. Robins C, McRae AF, Powell JE, Wiener HW, Aslibekyan S, Kennedy EM, Absher DM, Arnett DK, Montgomery GW, Visscher PM, Cutler DJ, Conneely KN. Testing Two Evolutionary Theories of Human Aging with DNA Methylation Data. Genetics. 2017 Jan 1;genetics.300217.2017. PMID: 28855307
- 13. Knight AK, Craig JM, Theda C, Bækvad-Hansen M, Bybjerg-Grauholm J, Hansen CS, Hollegaard MV, Hougaard DM, Mortensen PB, Weinsheimer SM, Werge TM, Brennan PA, Cubells JF, Newport DJ, Stowe ZN, Cheong JLY, Dalach P, Doyle LW, Loke YJ, Baccarelli AA, Just AC, Wright RO, Téllez-Rojo MM, Svensson K, Trevisi L, Kennedy EM, Binder EB, Iurato S, Czamara D, Räikkönen K, Lahti JMT, Pesonen A-K, Kajantie E, Villa PM, Laivuori H, Hämäläinen E, Park HJ, Bailey LB, Parets SE, Kilaru V, Menon R, Horvath S, Bush NR, LeWinn KZ, Tylavsky FA, Conneely KN, Smith AK. An epigenetic clock for gestational age at birth based on blood methylation data. Genome Biol. 2016 07;17(1):206. PMCID: PMC5054584
- 14. Peters MJ, Joehanes R, Pilling LC, Schurmann C, Conneely KN, Powell J, Reinmaa E, Sutphin GL, Zhernakova A, Schramm K, Wilson YA, Kobes S, Tukiainen T, NABEC/UKBEC Consortium, Ramos YF, Göring HHH, Fornage M, Liu Y, Gharib SA, Stranger BE, De Jager PL, Aviv A, Levy D, Murabito JM, Munson PJ, Huan T, Hofman A, Uitterlinden AG, Rivadeneira F, van Rooij J, Stolk L, Broer L, Verbiest MMPJ, Jhamai M, Arp P, Metspalu A, Tserel L, Milani L, Samani NJ, Peterson P, Kasela S, Codd V, Peters A, Ward-Caviness CK, Herder C, Waldenberger M, Roden M, Singmann P, Zeilinger S, Illig T, Homuth G, Grabe H-J, Völzke H, Steil L, Kocher T, Murray A, Melzer D, Yaghootkar H, Bandinelli S, Moses EK, Kent JW, Curran JE, Johnson MP, Williams-Blangero S, Westra H-J, McRae AF, Smith JA, Kardia SLR, Hovatta I, Perola M, Ripatti S, Salomaa V, Henders AK, Martin NG, Smith AK, Mehta D, Binder EB, Nylocks KM, Kennedy EM, Klengel T, Ding J, Suchy-Dicey AM, Enquobahrie DA, Brody J, Rotter JI, Chen Y-DI, Houwing-Duistermaat J, Kloppenburg M, Slagboom PE, Helmer Q, den Hollander W, Bean S, Raj T, Bakhshi N, Wang QP, Oyston LJ, Psaty BM, Tracy RP, Montgomery GW, Turner ST, Blangero J, Meulenbelt I, Ressler KJ, Yang J, Franke L, Kettunen J, Visscher PM, Neely GG, Korstanje R, Hanson RL, Prokisch H, Ferrucci L, Esko T, Teumer A, van Meurs JBJ, Johnson AD. The transcriptional landscape of age in human peripheral blood. Nat Commun. 2015 Oct 22;6:8570. PMCID: PMC4639797
- 15. Kennedy EM, Conneely KN, Vertino PM. Epigenetic Memory of Space Radiation Exposure. The Health Risks of Extraterrestrial Environments [Internet]. 2014 Jul 30; Available from: <u>https://threejsc.nasa.gov/articles/Vertino.pdf</u>
- 16. Gordon KV, Brownell M, Wang SY, Lepo JE, Mott J, Nathaniel R, Kilgen M, Hellein KN, Kennedy E, Harwood VJ. Relationship of human-associated microbial source tracking markers with Enterococci in Gulf of Mexico waters. Water Res. 2013 Mar 1;47(3):996–1004. PMID: 23260177
- 17. Hellein KN, **Kennedy EM**, Harwood VJ, Gordon KV, Wang SY, Lepo JE. A filter-based propidium monoazide technique to distinguish live from membrane-compromised microorganisms using quantitative PCR. J Microbiol Methods. 2012 Apr;89(1):76–78. PMID: 22314021
- Harwood VJ, Brownell M, Wang S, Lepo J, Ellender RD, Ajidahun A, Hellein KN, Kennedy E, Ye X, Flood C. Validation and field testing of library-independent microbial source tracking methods in the Gulf of Mexico. Water Res. 2009 Nov;43(19):4812–4819. PMID: 19595426

In Review at Peer-Reviewed Journals

1. **Kennedy EM**, Hermetz K, Burt A, Pei D, Koestler DC, Hao K, Chen J, Gilbert-Diamond D, Ramakrishnan U, Karagas MR, Marsit CJ. Placental microRNAs associate with early childhood growth characteristics.

medRxiv. 2022 Feb. <u>https://www.medrxiv.org/content/10.1101/2022.02.03.22270310v1</u> (*In revision at Pediatric Research*)

- Tehrani JM*, Kennedy EM, Tian F-Y, Everson TM, Deyssenroth M, Burt A, Hermetz K, Hao K, Chen J, Koestler DC, Marsit CJ. Variation in Placental microRNA Expression Associates with Familial Cardiovascular Disease. bioRxiv. Cold Spring Harbor Laboratory; 2021 Feb 2;2021.02.01.429202. (In revision at Pediatric Research)
- 3. Tehrani JM*, **Kennedy EM**, Tung PW, Burt A, Hermetz K, Punshon T, Jackson BP, Hao K, Chen J, Karagas MR, Koestler DC, Lester B, Marsit CJ. Dysregulation of human placental microRNAs via gestational cadmium exposure is implicated in neurobehavioral outcomes at birth. (*In revision at J Developmental Origins of Health and Disease*)
- 4. Appleton AA, Lin B, **Kennedy EM**, Holdsworth EA. Maternal depression and neighborhood conditions during pregnancy are associated with gestational epigenetic aging (*In reviesion at Epigenetics*)
- 5. Tung PW, Burt A, Hermetz K, **Kennedy EM**, Karagas MR, Marsit CJ. Prenatal lead (Pb) exposure is associated with differential placental DNA methylation and hydroxymethylation in a human population (*In review at Epigenetics*)

In preparation

- 1. **Kennedy EM**, Hermetz K, Burt A, Pei D, Koestler DC, Hao K, Chen J, Gilbert-Diamond D, Ramakrishnan U, Karagas MR, Marsit CJ. Placental MicroRNAs Associated with Pre-pregnancy BMI Link Placental Function and Early Childhood Growth (*In preparation*)
- Ladd-Acosta C, Barrett E, Bulka CM, Bush NR, Cardenas A, Dabelea D, Dunlop AL, Fry RC, Gao X, Goodrich JM, Herbstman J, Hivert MF, Kahn LG, Karagas MR, Kennedy EM, Knight AK, Mohazzab-Hosseinian S, Morin A, Niu Z, O'Shea MT, Ruden D, Schmidt RJ, Smith AK, Song A, Spindel E, Trasande L, Volk H, Weisenberger DJ, Breton CV. Pregnancy Complications and Epigenetic Gestational Age at Birth (In preparation)
- * Mentee

PRESENTATIONS

Oral Presentations

Local

- "Influence of placental microRNA on newborn birthweight" Emory University School of Nursing. Omics in Health and Disease Seminar. October 27, 2020 and October 5, 2021.
- "Influence of placental microRNA on newborn birthweight" Emory University Rollins School of Public Health. Omics in Public Health Research Seminar. October 12, 2020.
- "Placental microRNA Expression Associates with Birthweight Through Control of Adipocytokines: Results from Two Independent Cohorts" Emory University Molecules to Mankind Program Seminar. March 23, 2020.
- "Peer Review" Emory University Rollins School of Public Health Environmental Health Sciences Program Workshop. February 28, 2020.
- "Epigenome-Wide Patterns of DNA Methylation in Radiation Exposure and Gene Expression" Emory Department of Environmental Health Seminar November 2017.

National

"Placental MicroRNAs Associated with Pre-pregnancy BMI Link Placental Function and Early Childhood Growth" US Developmental Origins of Health and Disease. 2021 Annual Meeting. Virtual. November 10, 2021.

- "Placental miRNAs associate with early childhood growth characteristics" Society for Pediatric and Perinatal Epidemiologic Research. 2021 Annual Meeting. Virtual. June 8, 2021
- "Copper Associates with Differential Methylation in Placentae from Two US Birth Cohorts" The Teratology Society Annual Meeting. San Diego, CA. June 2019.

Poster Presentations

- Kennedy EM, Hermetz K, Burt A, Pei D, Koestler DC, Hao K, Chen J, Gilbert-Diamond D, Ramakrishnan U, Karagas MR, Marsit CJ. Maternal pre-pregnancy BMI associates with sex-specific placental microRNA patterns. American Society for Nutrition, NUTRTION 2022. June 2022.
- **Kennedy EM**, Hermetz K, Burt A, Everson TM, Hao K, Chen J, Karagas MR, Marsit CJ. Placental microRNAs in the regulation of fetal growth: a meta-analysis of two independent mother-infant cohorts. American Society of Human Genetics annual meeting. Houston, TX. October 2019.
- **Kennedy EM**, Goehring GN, Nichols MH, Robins C, Mehta D, Klengel T, Smith AK, Conneely KN. An integrated -omics analysis of the epigenetic landscape of gene expression in human blood cells. Poster 1672W. American Society of Human Genetics annual meeting. Orlando, FL. October 2017.
- **Kennedy E**, Powell DR, Li Z, Bell JSK, Feng H, Dynan W, Dwivedi B, Kowalski J, Conneely KN, and Vertino PM. Space radiation exposure induces stable epigenome alterations relevant to human lung cancer. AACR: Chromatin and Epigenetics in Cancer. Atlanta, GA. September 2015.
- **Kennedy EM**, Cravero K, Hellein K, and Lepo JE. Comparative efficiency of light sources for PMA activation to distinguish live vs. dead cells using qPCR. Poster Q1888. American Society for Microbiology General Conference, New Orleans, LA. May 2011.
- Kennedy EM, Hellein KN, Morrow A, and Lepo JE. A Filter-Based PMA Technique to Distinguish Live- from Membrane-Compromised Microorganisms in Environmental Waters. Poster Q-2393/806 American Society for Microbiology General Conference. San Diego, CA. May 2010.

ABSTRACTS

- Tehrani JM*, **Kennedy E**, Tung PW*, Burt A, Hermetz K, Punshon T, Jackson BP, Hao K, Chen J, Karagas MR, Koestler DC, Lester B, Marsit CJ. "Human placental microRNAs dysregulated by cadmium exposure predict neurobehavioral outcomes at birth in two independent birth cohorts". Society of Toxicology Annual Meeting. San Diego, CA. March 2022.
- Tung PW*, Burt A, Hermetz K, **Kennedy E**, Marsit CJ. "Prenatal lead exposure is associated with differential placental DNA methylation and hydroxymethylation in a human population". Society of Toxicology Annual Meeting. San Diego, CA. March 2022.
- Tehrani JM*, **Kennedy EM**, Burt A, Hermetz K, Punshon T, Jackson BP, Hao K, Chen J, Karagas MR, Koestler DC, Marsit CJ. "Placental microRNAs dysregulated by gestational cadmium exposure are implicated in placentation and neurodevelopment" Oral Presentation. US Developmental Origins of Health and Disease. Chapel Hill, NC. October 2021.
- Tehrani JM*, Starks M, **Kennedy EM**, Burt A, Hermetz K, Punshon T, Jackson BP, Hao K, Chen J, Karagas MR, Marsit CJ. "Arsenic concentrations in the placenta are associated with dysregulation of placental microRNA expression". Oral Presentation. International Society for Environmental Epidemiology Conference. Virtual. August 2021
- Tehrani JM*, **Kennedy E**, Tian F-Y, Burt A, Hermetz K, Punshon T, Jackson BP, Hao K, Chen J, Everson TM, Karagas MR, Marsit CJ. "Cadmium accumulation in the placenta associates with aberrant microRNA expression: results from a small RNA-seq analysis". Poster Presentation. International Society for Environmental Epidemiology (Virtual). August 2020.

Clarkson-Townsend D*, **Kennedy E**, Everson T, Deyssenroth M, Burt A, Hao K, Chen J, Pardue M, Marsit C. "Seasonal Gene Expression in Human Placenta". Poster Presentation. International Society for Environmental Epidemiology (Virtual). August 2020.

* Mentee

Guest Lecturer, Emory University Nell Hodgson Woodruff School of Nursing Course: 'Omics in Health and Disease Responsibilities: Developed and delivered a one hour lecture to a small group of doctoral students.Fall 2020Cuest Lecturer, Emory University Rollins School of Public Health Course: Environmental Health Seminar "'Omics in Public Health Research" Responsibilities: Developed and delivered a 20 minute lecture to a small group of MPH students.Fall 2020Cuest Lecturer, Emory University Course: Engienctics Responsibilities: Led discussion of my own research (PMCID: PMC7028322) in a class of 30 undergraduate students.Fall 2018, 2019Facilitator, Emory University School of Medicine Course: GeneticsFall 2018, 2019Responsibilities: Led group discussions with groups of 20 first year medical students covering: Genetic Risk Analysis, Hereditary Cancer, and Prenatal Screening and Testing.Spring 2014Course: Computational Biology and BioinformaticsSpring 2012Course: Microbiology Responsibilities: Delivered a one hour lecture on the history of the field of microbiology to a group of 100 undergraduate students.Spring 2012Adjunct Instructor, Pensacola State College Course: Anatomy and Physiology I Lab Responsibilities: Developed short introductory lectures to orient undergraduate students to laboratory assignments. Wrote quizzes. Graded assignments, quizzes and tests.Spring 2012Adjunct Instructor, University of West Florida Course: General Biology Laboratory Course: General Biology LaboratorySpring 2011 Course: Anatomy and Physiology I Laboratory Spring 2011 Course: General Biology LaboratorySpring 2011 Course: General Biology Laboratory Spring 2011 Course: General Biology Laboratory <b< th=""><th>TEACHING</th><th></th></b<>	TEACHING	
Course: Environmental Health Seminar "Omics in Public Health Research" Responsibilities: Developed and delivered a 20 minute lecture to a small group of MPH students.Fall 2020Guest Lecturer, Emory University Course: Epigenetics Responsibilities: Led discussion of my own research (PMCID: PMC7028322) in a class of 30 undergraduate students.Fall 2018, 2019Facilitator, Emory University School of Medicine Course: Genetics Responsibilities: Led group discussions with groups of 20 first year medical students covering: Genetic Risk Analysis, Hereditary Cancer, and Prenatal Screening and Testing: Course: Computational Biology and BioinformaticsSpring 2014Guest Lecturer, University of West Florida Course: Microbiology to a group of 100 undergraduate students.Spring 2012Adjunct Instructor, Pensacola State College Course: Anatomy and Physiology I Lab Responsibilities: Developed short introductory lectures to orient undergraduate students to laboratory assignments. Wrote quizzes. Graded assignments, quizzes and tests.Spring 2012Adjunct Instructor, University of West Florida Responsibilities: Developed short introductory lectures to orient undergraduate studentsSpring 2012Adjunct Instructor, University of West Florida Course: General Microbiology Laboratory Responsibilities: Developed short introductory lectures to orient undergraduate studentsSpring 2012Adjunct Instructor, University of West Florida Responsibilities: Developed short introductory lectures to orient undergraduate studentsSpring 2012Course: General Microbiology Laboratory Responsibilities: Developed short introductory lectures to orient undergraduate studentsSpring 2011Adjunct Instructor, University of West Florida Responsibili	<i>Course</i> : 'Omics in Health and Disease <i>Responsibilities</i> : Developed and delivered a one hour lecture to a small group of doctoral	
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Course: Microbiology Responsibilities: Delivered a one hour lecture on the history of the field of microbiology to a group of 100 undergraduate students.Spring 2012Adjunct Instructor, Pensacola State College Course: Anatomy and Physiology I Lab 		Spring 2014
Course: Anatomy and Physiology I Lab Responsibilities: Developed short introductory lectures to orient undergraduate students to laboratory assignments. Wrote quizzes. Graded assignments, quizzes and tests.Adjunct Instructor, University of West Florida Course: Anatomy and Physiology I Laboratory Course: General Microbiology Laboratory Course: General Biology LaboratorySpring 2012 Spring 2011 Fall 2011Responsibilities: Developed short introductory lectures to orient undergraduate students to laboratory assignments. Wrote quizzes. Graded assignments, quizzes and tests.Spring 2012 Spring 2011 Fall 2011Teaching Assistant, University of West FloridaFall 2010	<i>Course:</i> Microbiology <i>Responsibilities:</i> Delivered a one hour lecture on the history of the field of microbiology	
Course: Anatomy and Physiology I LaboratorySpring 2012Course: General Microbiology LaboratorySpring 2011Course: General Biology LaboratoryFall 2011Responsibilities: Developed short introductory lectures to orient undergraduate studentsFall 2011to laboratory assignments. Wrote quizzes. Graded assignments, quizzes and tests.Fall 2010	Course: Anatomy and Physiology I Lab <i>Responsibilities</i> : Developed short introductory lectures to orient undergraduate students	Spring 2012
	Course: Anatomy and Physiology I Laboratory Course: General Microbiology Laboratory Course: General Biology Laboratory Responsibilities: Developed short introductory lectures to orient undergraduate students	Spring 2011
Course: General Microbiology Laboratory	Teaching Assistant, University of West Florida Course: General Microbiology Laboratory	Fall 2010

MENTORSHIP

Kennedy 8

Current: Hamilton C	College, Freshman
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Undergraduate Students Robert Paine, PhD, UWF Current: Postdoctoral Fellow, Tennessee Tech University	2011 - 2012
Yen Chau, MD, UWF Current: Pediatric Anesthesiologist, Ascension Sacred Heart, Pensacola, FL	2010 - 2011
Karen Cravero, PhD, UWF Current: Johns Hopkins University Graduate. Medical Student, University of Florida	2010 - 2012
Karl Mereus, Pharm D, University of West Florida Current: Manager, Regulatory Affairs, Passage Bio	2009 - 2010
Graduate Students Michael Mortillo (Emory), Research Mentor Current: Emory graduate student	Fall 2021 – Curr.
Millie Tung (Emory), Research Mentor Current: Emory graduate student	Spr 2021 – Curr.
Keenan Wiggins (Emory), Human Genetics Course Mentor Current: Emory graduate student	Fall 2019
Courtney Willet, Emory, Rotation mentor Current: Emory graduate student	Spr 2019
Nadia Harerimana, Emory, Human Genetics Course Project Mentor Current: Associate Computational Scientist at Mount Sinai	Fall 2018
Jesse Tehrani (Emory), Research mentor Current: Associate Strategy Consultant, Triangle Insights Group	Fall 2018-Spr 2022
Sarah Menz, MSPH, Emory, Master's Thesis Mentor Current: Epidemiologist, Washington State Department of Health	Spr-Fall 2018
Danielle Clarkson-Townsend (Emory), Research mentor Current: Research Fellow in Sleep Medicine, Harvard Medical School	Spr 2018-2021

SERVICE

Scientific Reviewer Scientific Reports Journal of the American Society of Nephrology Epigenetics	eLife Clinical Epigenetics
Society Memberships Genetics Society of America Society for Pediatric and Perinatal Epidemiologic Research	American Society of Human Genetics US DOHaD Society
Conference Session Moderator ASHG 2019 - Prenatal Diagnosis and Pregnancy Loss	