Travis Beckwith, Ph.D.

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Google Scholar: https://scholar.google.com/citations?user=wolY848AAAAJ&hl=en (Citations: 382, h-index: 10)

PROFESSIONAL SUMMARY

Neuroscientist with 15+ years of experience in neuroimaging, environmental health, and quantitative methods; additional expertise in epidemiology and clinical and translational research. Applied experience in AI model development, adversarial testing, and neurotechnology consultation. Complementary skills in machine learning, open-source software development, and data pipeline engineering developed through independent research and hands-on tool-building. Proven ability to translate research into practical tools, publications, and real-world impact across academic, clinical, and industry settings. Principal neuroimaging analyst for 3 NIH-funded longitudinal cohorts. Author of 11 peer-reviewed publications, including 3 first-author papers with documented impact across national media and legal and policy contexts. Developer of publicly released open-source neuroimaging tools spanning pipeline automation, data standardization, and hardware diagnostics. Aims to direct large-scale translational research initiatives, converting neuroimaging and epidemiological findings into actionable clinical interventions.

RESEARCH & PROFESSIONAL INTERESTS

- **Brain-Behavior Relationships:** Neural mechanisms underlying cognitive and behavioral outcomes across environmental health, neurotrauma, and clinical populations.
- **Neuroimaging Methods & Pipeline Development:** Design, optimization, and validation of multimodal MRI analysis workflows for structural, functional, diffusion, and microstructural imaging, including structural connectomics and advanced diffusion modeling.
- **Applied Neuroscience & Computational Approaches:** Integration of machine learning, deep learning, and emerging analytic techniques into neuroimaging pipelines and research workflows.
- **Translational Neuroscience:** Application of neuroimaging and epidemiological research to clinical practice, public health, and neurotechnology development.

EDUCATION

Ph.D., Neuroscience | 2008–2015
University of Cincinnati College of Medicine, Cincinnati, OH

- Dissertation: "A Magnetic Resonance Imaging Study of the Developmental Consequences of Childhood Lead Exposure in Adulthood"
- Committee: Kim Cecil, PhD; Kim Dietrich, PhD; James Eliassen, PhD; James Herman, PhD; Michael Williams, PhD

B.A., Psychology & Neuroscience; B.F.A., Creative Writing & English | 2001–2007
Bowling Green State University, Bowling Green, OH

- Graduated cum laude with University and English Honors

Additional Training

Post-Baccalaureate Certificates

- **Clinical and Translational Research** | 2018–2019
  University of Cincinnati College of Medicine, Cincinnati, OH
- **Preparing Future Faculty Program** | 2012–2013
  University of Cincinnati, Cincinnati, OH

Neuroimaging Methods Training

- CONN Toolbox Functional Connectivity Workshop | 2015

Workshops

- NIH Grant Writing Workshops | May 2020 | Cincinnati Children's Hospital Medical Center
  - Planning and Writing Successful NIH Career Development (K) Awards
  - Planning and Writing Successful NIH R01 Renewals and Submissions

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TECHNICAL SKILLS

Neuroimaging Platforms: FSL • MRtrix3 • DESIGNER2 • AFNI • SPM (including CAT12) • FreeSurfer • ANTs • fMRIPrep • AMICO • CONN • ImageJ • E-Prime • PsychoPy

Modalities: fMRI (task-based & resting-state) • Diffusion MRI (DTI, CSD, multi-shell) • NODDI microstructure modeling • MRS • Structural/Volumetric • Surface-based morphometry • Structural connectomics • FDG-PET/CT (limited experience)

Analysis Methods: CSD tractography (multi-tissue, single- and multi-shell) • SIFT2 streamline filtering • NODDI microstructure estimation (NDI, ODI, FWF) • Atlas-based connectome construction (Desikan-Killiany) • Multi-weighted connectivity matrices (streamline count, FA, length) • Cortical thickness analysis • Cortical surface area & gyrification • Volumetric segmentation • White matter tractography (deterministic & probabilistic) • Resting-state connectivity (ICA) • Brain-behavior correlation • Longitudinal progression tracking • Multimodal integration • Quality assurance/quality control

Programming & Scripting: Python (TensorFlow, nibabel, AMICO, NumPy, scikit-learn) • R • MATLAB • Bash/Shell scripting (advanced: associative arrays, parallel job execution, configurable pattern matching) • SAS

Machine Learning & Deep Learning: Deployment of pre-trained deep learning models for neuroimaging registration (SynthMorph, VoxelMorph) • GPU-accelerated inference (CUDA/TensorFlow) • Automated method selection and quality-based fallback logic • Integration of ML components into production Bash pipelines

Statistical Methods: GLM • Mixed/multilevel models • Longitudinal analysis • Multiple comparisons correction • Multivariate approaches • Machine learning

Data Management & Reproducibility: BIDS format specification • BIDS scaffold generation and metadata enrichment • Multi-modal DICOM-to-BIDS conversion tooling (dcm2niix integration, configurable pattern mapping, parallel processing, source archival) • Git/GitHub • Containerized workflows (Docker, Singularity/Apptainer) • Checkpoint-based pipeline resumption • Structured logging (text, HTML, JSONL) • Data documentation & SOPs

Computing Environment: High-performance computing (SLURM) • Containerized pipeline deployment • WSL2 (Windows Subsystem for Linux 2) • NVIDIA GPU computing environments • Hardware benchmarking and computational environment validation for neuroimaging workloads

Data Visualization & Reporting: R • SAS • AFNI • FSL • FreeSurfer • SPM • Automated per-subject QC reports (multi-page PDF with image mosaics, metrics tables, and connectome matrix) • Analysis reports for investigators • Publication and conference figures

MRI Operations: Siemens 3T Prisma operation (Level 1 certified, 2023) • syngo platform • Protocol implementation • Sequence selection • Human subjects scanning

PROFESSIONAL EXPERIENCE

Neurotechnology Adviser | 2025–Present
MetaBrain Labs Inc.

- Led research methodology design for pilot study protocol, including study design, outcome measure selection, and human subjects research considerations.
- Advise on integration of neuroscience principles and cognitive behavioral methodologies (cognitive restructuring, belief reframing), and EEG-based neurofeedback systems into product development.
- Design data collection protocols and translate research findings for academic publications and commercial stakeholders.
- Provide research methodology and neuroscience consultation to early-stage neurotechnology startup developing AI-powered cognitive performance platform serving elite sports teams.

Domain Expert, AI Training | 2024–Present
Outlier AI

- Achieved "Oracle" contributor status recognizing sustained high-quality performance across 10+ projects over 14-month tenure.
- Design frontier-level adversarial prompts targeting model failure in neuroscience, biology, clinical medicine, pharmacology, and broader STEM domains; validate failure modes and generate evaluation rubrics specifying reward criteria, accuracy standards, and penalty conditions to guide correct model responses.
- Test agentic AI systems for domain knowledge failures and reasoning errors across multi-step tasks, assessing accuracy and logical coherence in neuroscience and biomedical contexts.
- Review AI model outputs and contributor-generated content for scientific accuracy and alignment with quality standards, providing task-level feedback to quality managers.
- Generate and validate detailed image descriptions and annotations for multimodal AI training initiatives.

Independent Neuroimaging Software Development | 2024–Present
Open-Source Tools | GitHub: https://github.com/TravisBeckwith

Integrated DTI Processing Pipeline *(Bash/Python, v2)*

- Designed and built an integrated diffusion MRI processing and structural connectivity pipeline for BIDS-formatted datasets, incorporating DESIGNER2-based preprocessing (topup, eddy, Rician denoising), ML-enhanced registration, SS3T-CSD tractography, connectome construction, and NODDI microstructure modeling.
- Implemented ML-enhanced T1w-to-DWI registration with automatic selection between SynthMorph (FreeSurfer), VoxelMorph, and ANTs, including GPU-accelerated inference via TensorFlow and quality-based fallback logic.
- Integrated NODDI microstructure estimation (NDI, ODI, FWF) via AMICO, with automated API version handling for cross-version compatibility.
- Implemented SS3T-CSD whole-brain tractography (10M streamlines) with SIFT2 biological filtering, atlas-space parcellation registration, and Desikan-Killiany connectome construction generating three SIFT2-weighted connectome matrices (streamline count, mean FA, mean length).
- Built two-level checkpoint system enabling safe pipeline resumption after interruption, with stage-level tracking and fine-grained progress monitoring.
- Engineered automated per-subject QC reporting generating a multi-page PDF with axial slice mosaics (b0, FA, MD, NDI, ODI), pipeline stage status, white matter metrics table, and structural connectome matrix.
- Designed configurable multi-drive storage architecture supporting flexible deployment across HPC and local computing environments including WSL2.
- Orchestrated containerized Synb0-DisCo execution within the broader pipeline for susceptibility distortion correction, with automatic container runtime detection (Docker/Singularity/Apptainer).

BIDS Conversion Tool *(Bash/Python)*

- Developed a robust, configurable DICOM-to-BIDS conversion tool supporting multi-modal neuroimaging data (anatomical, functional, diffusion, fieldmap, perfusion, PET) with automatic folder detection and session-aware directory structure handling.
- Implemented configurable pattern-matching system for mapping DICOM folder naming conventions to BIDS modalities, supporting user-editable configuration files with glob-based matching.
- Built parallel conversion capability with configurable job count, source data archival, and safe deletion with verification of successful conversion output.
- Automated BIDS metadata enrichment including JSON sidecar injection (TaskName, RepetitionTime, IntendedFor placeholders) and full BIDS scaffold generation (dataset_description.json, participants.tsv, README, CHANGES, .bidsignore).

- Incorporated dry-run mode for full action preview without data modification, supporting safe validation of conversion parameters before execution.
- Designed tool for integration with bids-validator for post-conversion compliance verification.

Neuroimaging Hardware Diagnostic Tool *(Python)*

- Built a lightweight Python diagnostic utility for neuroimaging researchers to assess hardware readiness for MRI processing pipelines (FreeSurfer, fMRIPrep, FSL, AFNI).
- Implemented system profiling including RAM capacity assessment against neuroimaging workload thresholds, disk I/O benchmarking for 4D dataset processing, and NVIDIA CUDA GPU detection for accelerated tools.
- Designed WSL2-specific verification to confirm correct resource allocation in Windows Subsystem for Linux environments.
- Provided interpretive output with actionable recommendations mapped to specific neuroimaging processing capabilities.

Documentation & Dissemination

- Published all tools on GitHub with supporting documentation and assigned DOIs; maintains academic portfolio at travisbeckwith.github.io/CV.
- Additional tools in active development include a mediation analysis package for MRI data (neuromediate), a microstructural diffusion mapping tool (NERVES), and an ML-based survey analysis package (surveykit-ml).

Postdoctoral Research Fellow | 2023–2024
Clinical Neurotrauma Lab | Department of Kinesiology | Indiana University, Bloomington, IN

- Led statistical analysis and manuscript preparation for pilot study examining ADHD diagnosis as a moderating variable in cognitive outcomes following repetitive subconcussive head impacts.
- Independently determined analysis software selection and preprocessing strategy for new research context, evaluating tool suitability for task-based fMRI analysis of subconcussive head impact data.
- Developed and executed task-based fMRI analysis pipeline using fMRIPrep preprocessing and AFNI statistical modeling for N-back working memory paradigm in longitudinal sports injury cohort, including review of motion parameter summaries and artifact flagging to ensure data integrity prior to group-level analyses.
- Began independent development of integrated diffusion MRI processing pipeline incorporating advanced methods (CSD, NODDI, structural connectomics, ML-enhanced registration) beyond those used in ongoing lab projects.
- Collaborated across Kinesiology and Neuroscience departments, providing neuroimaging methodology consultation to research team members.

- Conducted systematic literature review synthesizing blood biomarker and nervous system damage research to inform ongoing study design.
- Trained graduate students on neuroimaging software tools, command-line fundamentals, and analysis procedures, supporting development of independent analysis skills within the lab.
- Acquired neuroimaging data as certified Level 1 MRI scanner operator on Siemens 3T Prisma (syngo), including protocol implementation, sequence selection, and quality assurance for human subjects scanning.
- Deployed containerized workflows via Singularity on institutional HPC cluster (SLURM), managing BIDS-formatted datasets and batch processing across subjects.
- Performed DICOM-to-NIfTI conversion (dcm2niix) and organized datasets into BIDS-compliant directory structures using custom Bash scripts, ensuring pipeline-ready data formatting and compliance with community standards..

Career Pause | 2021–2023
Professional hiatus to address family and personal priorities during the COVID-19 pandemic.

Postdoctoral Research Fellow | 2018–2021
Molecular Epidemiology in Children's Environmental Health Training Program | Division of Epidemiology | Department of Environmental Health & Public Health Services | University of Cincinnati College of Medicine, Cincinnati, OH

- Served as principal neuroimaging analyst for three concurrent NIH-funded longitudinal cohorts (Cincinnati Lead Study, CCAAPS, HOME Study), developing and implementing multimodal analysis pipelines for structural MRI, fMRI, DTI, and MRS data.
- Independently initiated cortical thickness analysis approach for air pollution cohort, contributing novel methodological perspective that resulted in first-author publication and recognition in the CCHMC annual research report.
- Provided methodological consultation informing study design decisions, including acquisition protocol recommendations and analysis strategy development across research teams.
- Collaborated with epidemiologists, radiologists, and environmental health researchers to integrate neuroimaging outcomes into broader study analyses, supporting diverse research questions across teams.
- Generated analysis summary reports and statistical visualizations for principal investigators, translating pipeline outputs into interpretable results supporting study-level decision-making across three concurrent cohorts.
- Designed and standardized quality control procedures for multimodal neuroimaging data, including generating QC summary reports, flagging processing outliers, and documenting subject-level data quality across study populations with varying acquisition parameters.

- Processed and managed large-scale, BIDS-compliant neuroimaging datasets on institutional HPC infrastructure (SLURM), implementing batch processing workflows via Bash scripting.
- Managed neuroimaging data workflows from scanner acquisition through DICOM server to dedicated storage and HPC processing environments, including DICOM-to-NIfTI conversion and BIDS-compliant dataset organization, for efficient pipeline execution across three concurrent studies.
- Conducted systematic visual inspection and manual quality assurance of all processed neuroimaging data prior to statistical analysis, identifying and resolving artifacts and processing errors.
- Prepared de-identified neuroimaging datasets for external data sharing in support of collaborative meta-analysis research.
- Authored and co-authored six peer-reviewed publications translating pipeline analyses into scientific findings on environmental impacts on brain development.
- Contributed to three conference presentations and two published proceedings disseminating methodological and scientific outcomes.
- Enhanced expertise in epidemiological methods, longitudinal research design, and science communication through T32-funded professional development activities.
- Maintained compliance with IRB protocols as listed key personnel, including annual conflict of interest assessments and protocol renewals.

Postdoctoral Research Fellow | 2015–2017
Imaging Research Center | Department of Radiology | Cincinnati Children's Hospital Medical Center, Cincinnati, OH

- Served as primary methodological resource for software and pipeline selection, advising principal investigators and research teams on tool suitability for specific study designs and data characteristics.
- Evaluated and compared neuroimaging analysis tools and preprocessing approaches (e.g., FSL vs. Tortoise for diffusion imaging, ANTs for registration, smoothing kernel optimization, atlas selection, motion correction thresholds) to inform methodological decisions and optimize pipeline performance.
- Authored technical documentation for MRI_Analysis_Calculator ImageJ plugin, creating standardized processing manual adopted for ongoing lab use.
- Developed processing protocol for and assisted with analysis of FDG-PET/CT data examining brain activation in a preclinical stress model, contributing to a Society for Neuroscience conference presentation.
- Provided neuroimaging analysis expertise for interdisciplinary research projects within a shared imaging center environment, utilizing structural MRI, DTI, MRS, and fMRI across multiple concurrent studies.
- Processed and managed neuroimaging datasets on institutional HPC cluster (SLURM), supporting reproducible analysis workflows across research teams.

- Identified and corrected a critical preprocessing error in fMRI analysis scripts acquired from an external laboratory, catching the issue prior to statistical analysis and notifying the originating lab.
- Validated processing consistency across software versions to ensure reproducibility and reliability of longitudinal analysis outputs.
- Generated and presented analysis summaries, statistical maps, and visualization outputs to collaborative research teams, supporting data interpretation and project decision-making.
- Trained summer research students on neuroimaging analysis software and basic image processing procedures.
- Contributed to five conference abstracts including one as first author.
- Maintained compliance with IRB protocols as listed key personnel across multiple concurrent research studies.

Graduate Research Assistant | 2008–2015
Neuroscience Graduate Program | University of Cincinnati College of Medicine, Cincinnati, OH

- Led multiple independent research projects investigating the effects of childhood lead exposure on neurodevelopment using multimodal MRI approaches, operating with significant autonomy under faculty mentorship.
- Developed and implemented a novel VBM methodology for rodent MRI data, establishing standardized templates and automated batch processing procedures adopted for ongoing lab use and contributing to Lindquist et al. (2015).
- Co-authored five peer-reviewed research publications, two review articles, and one book chapter.

Research Assistant & Lab Technician | 2006–2008
Biology of Affect & Motivation Laboratory | Department of Psychology | Bowling Green State University, Bowling Green, OH

- Contributed to 3 publications, 3 conference proceedings, and 7 conference abstracts on emotional processing and affective neuroscience research.
- Executed behavioral experiments using rodent models, collected and scored data, and maintained testing equipment in compliance with IACUC protocols.
- Managed rodent colony including daily husbandry and care.

Undergraduate Research Assistant | 2006–2007
Transition to Parenthood Study | Department of Psychology | Bowling Green State University, Bowling Green, OH

- Transcribed and entered questionnaire data into a research database for a longitudinal study of relationship transitions.

GRANTS & FUNDING

- **NIEHS T-32 Training Grant Fellowship (T32-ES10957)** | 2018–2020
  Molecular Epidemiology in Children's Environmental Health (MECEH) Training Program | University of Cincinnati College of Medicine

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HONORS & AWARDS

Research & Fellowship Awards:

- 2018–2020: NIEHS T-32 Training Grant Fellowship, MECEH Training Program, University of Cincinnati College of Medicine
- 2008–2015: Neuroscience Graduate Program Fellowship, University of Cincinnati College of Medicine

Research Recognition:

- 2020: Featured Research, Department of Radiology, Cincinnati Children's Research Foundation Annual Report: "Reduced Cortical Thickness Associated with Traffic-Related Air Pollution in a Longitudinally Studied Pediatric Cohort"
- 2020: Most-Shared Findings of January 2020, Cincinnati Children's Hospital Medical Center (CCHMC) Research Horizons Blog

Academic Honors:

- 2007: Outstanding Research Award (Year-long Project), Psychology Undergraduate Research Symposium, Bowling Green State University
- Psi Chi International Honor Society in Psychology
- Sigma Tau Delta International Honor Society in English

Scholarships:

- 2001–2002: President's Achievement Scholarship, Bowling Green State University

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RESEARCH AND SCHOLARLY ACTIVITIES

Publications

Peer-reviewed Journals

1. **Beckwith, T.J.**, Dietrich, K.N., Wright, J.P., Altaye, M. and Cecil, K.M. (2021). Criminal arrests associated with reduced regional brain volumes in an adult population with documented childhood lead exposure. *Environmental Research*, 201, p.111559. PMID: 34181918 DOI: 10.1016/j.envres.2021.111559
2. **Beckwith, T.**, Cecil, K.M., Altaye, M., Severs, R., Wolf, C., Percy, Z., Maloney, T., Yolton, K., LeMasters, G., Ryan, P.H. (2020). Reduced Cortical Thickness Associated with Traffic-Related Air Pollution in a

Longitudinally Studied Pediatric Cohort. *PLoS One* 15 (1), e0228092. PMID: 31978108 PMCID: PMC6980590 DOI: 10.1371/journal.pone.0228092
Altmetric Attention Score: 425 (top 5% of all research outputs; 99th percentile among outputs of same age and source). International media coverage including Reuters, Daily Mail, and ScienceDaily. Cited 70 times; Field Citation Ratio: 12.16 (Dimensions). Metrics as of April 2026.

3. Fleck, D.E., Eliassen, J.C., Guerdjikova, A.I., Mori, N., Williams, S., Blom, T.J., **Beckwith, T.**, Tallman, M.J., Adler, C.M., DelBello, M.P., Strakowski, S.M., McElroy, S.L. (2019). Effect of Lisdexamfetamine on Emotional Network Brain Dysfunction in Binge Eating Disorder. *Psychiatry Research: Neuroimaging* 286, 53-59. PMID: 30903953 DOI: 10.1016/j.pscychresns.2019.03.003

4. Brunst, K.J., Ryan, P.H., Altaye, M., Yolton, K., Maloney, T., **Beckwith, T.**, LeMasters, G., Cecil, K.M. (2019). Myo-inositol mediates the effects of traffic-related air pollution on generalized anxiety symptoms at age 12 years. *Environmental Research* 175, 71-78. PMID: 31103795 PMCID: PMC6571158 DOI: 10.1016/j.envres.2019.05.009
Altmetric Attention Score: 328 (top 5% of all research outputs; 99th percentile among outputs of same age). Cited 44 times (Dimensions). Metrics as of April 2026.

5. Raghubar, K.P., Lamba, M., Cecil, K., Yeates, K.O., Mahone, E.M., Limke, C., Grosshans, D., **Beckwith, T.J.**, Ris, M.D. (2018). Dose-volume Metrics and their Relation to Memory Performance in Pediatric Brain Tumor Patients: A Preliminary Study. *Pediatric Blood & Cancer* 65, e27245. PMID: 29856521 PMCID: PMC7388179 DOI: 10.1002/pbc.27245

6. **Beckwith, T.J.**, Dietrich, K.N., Wright, J.P., Altaye, M., Cecil, K.M. (2018). Reduced Regional Volumes Associated with Total Psychopathy Scores in an Adult Population with Childhood Lead Exposure. *NeuroToxicology* 67, 1-26. PMID: 29634994 PMCID: PMC6054826 DOI: 10.1016/j.neuro.2018.04.004

7. Lindquist, D.M., **Beckwith, T.**, Cecil, K.M., Sánchez-Martín, F.J., Landero Figueroa, J., Puga, A. (2015). Prenatal and Early Postnatal Lead Exposure in Mice: Neuroimaging Findings. *Quantitative Imaging in Medicine and Surgery* 5 (4), 511-518. PMID: 26435914 PMCID: PMC4559981 DOI: 10.3978/j.issn.2223-4292.2015.07.01

8. Webber, E.S., Mankin, D., McGraw, J., **Beckwith, T.J.**, Cromwell, H.C. (2013). Ultrasonic Vocalizations, Predictability and Sensorimotor Gating in the Rat. *Behavioural Brain Research* 253, 32-41. PMID: 23850353 PMCID: PMC3759254 DOI: 10.1016/j.bbr.2013.07.013

9. Gitelman, D., Klein-Gitelman, M.S., Ying, J., Sagcal-Gironella, A.C., Zelko, F., Beebe, D., **Beckwith, T.**, Parrish, T., DiFrancesco, M., Brunner, H.I. (2013). Brain Morphometric Changes Associated with Child-Onset Systemic Lupus Erythematosus and Neurocognitive Deficit. *Arthritis & Rheumatism* 65 (8), 2190-2200. PMID: 23666759 PMCID: PMC3840703 DOI: 10.1002/art.38009

10. Webber, E.S., Harmon, K.M., **Beckwith, T.J.**, Peña, S., Burgdorf, J., Panksepp, J., Cromwell, H.C. (2012). Selective Breeding for 50 kHz Ultrasonic Vocalization Emission Produces Alterations in the Ontogeny and Regulation of Rough-and-Tumble Play. *Behavioural Brain Research* 229 (1), 138-44. PMID: 22266925 DOI: 10.1016/j.bbr.2012.01.012

11. Harmon, K.M., Greenwald, M., **Beckwith, T.J.**, McFarland, A.M., Cromwell, H.C. (2009). The Effects of Prenatal Stress on Motivation in the Rat Pup. *Stress* 12 (3), 250-8. PMID: 18951246 PMCID: PMC4137965 DOI: 10.1080/10253890802367265

Book Chapters

1. Cecil, K.M., **Beckwith, T.J.** (2013). A Toxicological Model of Frontal Lobe Injury: Childhood Lead Exposure. In A.E. Cavanna (Ed.), *Frontal Lobe: Anatomy, Functions and Injuries*. Hauppauge, NY: Nova Science Publishers, Inc., 57-78.

Invited Papers/Reviews

1. **Beckwith, T.**, Cecil, K.M. (2013). Acquired White Matter Injury: Infection and Inflammatory Processes. *Journal of Pediatric Neuroradiology* 2 (1), 97-108. DOI: 10.3233/PNR-13050
2. Cecil, K.M., **Beckwith, T.** (2013). Advanced Magnetic Resonance Techniques for Evaluating White Matter. *Journal of Pediatric Neuroradiology* 2 (1), 3-15. DOI: 10.3233/PNR-13043

Published Proceedings

1. **Beckwith, T.**, Dietrich, K., Wright, J., Cecil, K. (2020). Adult measures of criminality correlated with reduced regional brain volumes in a cohort with childhood lead exposure. *Neurotoxicology and Teratology*, 79, 106885. PMID: 32298771 PMCID: 7252070 DOI: 10.1016/j.ntt.2020.106885
2. Brunst, K.J., Ryan, P.H., Altaye, M., Yolton, K., Maloney, T., **Beckwith, T.**, LeMasters, G. and Cecil, K.M. (2018). Role of Traffic-Related Air Pollution on Brain Metabolism and Generalized Anxiety in Adolescents. *Annals of Epidemiology*, 28 (9), 660. DOI: 10.1016/j.annepidem.2018.06.059
3. Klein-Gitelman, M.S., Cedeno, A., Baker, A., Zelko, F., Beebe, D., Dina, B., Sagcal-Gironella, A.C.P., **Beckwith, T.**, Brunner, H.I., DiFrancesco, M., Gitelman, D. (2011). Brain Morphometric Changes Associated with Childhood-Onset Systemic Lupus Erythematosus and Neurocognitive Deficit. *Arthritis & Rheumatism*, 63 (S10), S293. DOI: 10.1002/art.33310
4. McFarland, A.M., **Beckwith, T.J.**, Tran, T., Greenwald, M. and Cromwell, H.C. (2008). The Effects of Natural Fluctuations in Early Maternal Care on the Affective and Behavioral States of the Offspring of Long-Evans Rats. *Ohio Journal of Science*, 108 (1), A-19.
5. Greenwald, M., McFarland, A.M., **Beckwith, T.J.**, Cromwell, H.C. (2008). The Effects of Prenatal Prozac on Affective and Behavioral States of the Offspring in Long-Evans Rats. *Ohio Journal of Science*, 108 (1), A-34.
6. **Beckwith, T.J.**, McFarland, A.M., Greenwald, M., Harmon, K., Meserve, L.A., Cromwell, H.C. (2007). Effects of Perinatal Perturbations on Social Communication in the Rat Model. *Ohio Journal of Science*, 107 (1), A-17.

Manuscripts In Preparation

1. **Beckwith, T.**, Nowak, M., Kawata, K. Role of ADHD Diagnosis on Working Memory Before and After Repetitive Subconcussive Head Impacts: A Pilot Study

2. **Beckwith, T**. An Integrated Pipeline for Diffusion MRI Processing, ML-Enhanced Registration, Structural Connectomics, and NODDI Microstructure Modeling *(working title; target: JOSS, Frontiers in Neuroinformatics, or NeuroImage)*

PRESENTATIONS

Talks & Seminars

1. "Childhood Lead Exposure: Influences on Adult Brain and Behavior." Epidemiology Seminar Series, Department of Environmental Health, University of Cincinnati College of Medicine, 2020
2. "Childhood Lead Exposure: Influences on the Brain and Behavior in Adulthood." Molecular Epidemiology in Children's Environmental Health Training Program, University of Cincinnati College of Medicine, 2019
3. "Brain Differences Associated with Traffic-Related Air Pollution in a Longitudinally Studied Pediatric Cohort." Molecular Epidemiology in Children's Environmental Health Training Program, University of Cincinnati College of Medicine, 2018
4. "A Magnetic Resonance Imaging Study of the Developmental Consequences of Childhood Lead Exposure in Adulthood." Public Dissertation Defense, Neuroscience Graduate Program, University of Cincinnati College of Medicine, 2015
5. "Adult Neuroimaging Abnormalities Associated with Childhood Lead Exposure." Neuroscience Seminar Series, Neuroscience Graduate Program, University of Cincinnati College of Medicine, 2012
6. "White Matter Abnormalities Associated with Childhood Lead Exposure." Neuroscience Seminar Series, Neuroscience Graduate Program, University of Cincinnati College of Medicine, 2012
7. "Childhood Lead Exposure: How it Alters Brain and Behavior in Adults." Neuroscience Seminar Series, Neuroscience Graduate Program, University of Cincinnati College of Medicine, 2011
8. "The Effects of PCB's on Ultrasonic Vocalizations." Neural and Cognitive Sciences Brown Bag Seminar, Department of Psychology, Bowling Green State University, 2007

Conference Presentations

1. Cecil, K.M., **Beckwith, T.J.**, Brunst, K.J., Yolton, K., LeMasters, G., Ryan, P. (2020). Traffic-Related Air Pollution Associated with Altered Neuroimaging Outcomes in a Longitudinally Studied, Pediatric Cohort. Electronic poster presented at the 58th Annual Meeting of the American Society of Neuroradiology, Las Vegas, NV, May 30–June 3.
2. Brunst, K.J., Cecil, K., Altaye, M., **Beckwith, T.**, Yolton, K., LeMasters, G., Ryan, P. (2018). Brain Metabolite Levels May Mediate Traffic-Related Air Pollution Associated Generalized Anxiety Symptoms: Findings from the Cincinnati Childhood Allergy and Air Pollution Study. Poster presented at ISES-ISEE Joint Annual Meeting, Ottawa, Ontario, Canada, August 26–30. O01.04.11

3. Fleck, D., Eliassen, J., Guerdjikova, A.I., Williams, S., Blom, T., **Beckwith, T.**, Tallman, M., McElroy, S. (2018). Effect of Lisdexamfetamine on Prefrontal Brain Dysfunction in Binge Eating Disorder. Poster presented at the Annual Meeting of the American Society of Clinical Psychopharmacology, Miami Beach, FL, May 29–June 1. T7

4. Cecil, K., Maloney, T., Altaye, M., Severs, R., Wolfe, C., Percy, Z., **Beckwith, T.**, Yolton, K., LeMasters, G., Ryan, P. (2017). Traffic-Related Air Pollution Associated with Activation in a Functional MRI Verb Generation Task of a Longitudinally Studied, Pediatric Cohort. Electronic poster presented at the 25th Annual Meeting of ISMRM, Honolulu, HI, April 22–27. 4600

5. Cecil, K., **Beckwith, T.**, Altaye, M., Severs, R., Wolfe, C., Percy, Z., Maloney, T., Yolton, K., LeMasters, G., Ryan, P. (2017). Traffic-Related Air Pollution Associated with Reduced Cortical Thickness and Altered White Matter Organization in a Longitudinally Studied, Pediatric Cohort. Oral Presentation (#0185) at the 25th Annual Meeting of ISMRM, Honolulu, HI, April 22–27. 3615

6. Cecil, K., **Beckwith, T.**, Wright, J., Dietrich, K. (2016). Volumetric and Diffusion Tensor Imaging Outcomes Associated with Adult Measures of Criminality in a Cohort with Childhood Lead Exposure. Presentation at the 54th Annual Meeting of the American Society of Neuroradiology, Washington, DC, May 23–26. O-240

7. Cecil, K., Hugentobler, J., Quatman-Yates, C., Gubanich, P., Altaye, M., Wade, S., **Beckwith, T.**, Kurowski, B. (2016). Spectroscopic Outcomes Associated with an Aerobic Intervention Following Mild Traumatic Brain Injury in Adolescents. Electronic poster presented at the 54th Annual Meeting of the American Society of Neuroradiology, Washington, DC, May 23–26. eP-188

8. **Beckwith, T.**, Cecil, K.M., Wright, J.P., Dietrich, K.M. (2016). Adult Measures of Psychopathy in a Cohort with Childhood Lead Exposure: Volumetric and Diffusion Tensor Imaging Outcomes. Electronic poster presented at the 54th Annual Meeting of the American Society of Neuroradiology, Washington, DC, May 23–26. eP-73

9. Egan, A., Eliassen, J., Norris, M., Lemen, L., LaSance, K., **Beckwith, T.**, Lindquist, D., Ulrich-Lai, Y. (2015). Use of FDG Positron Emission Tomography to Visualize Brain Activation in a Model of Stress Relief by "Comfort" Food. Poster presented at 45th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 17–21. W25

10. **Beckwith, T.**, Dietrich, K., Cecil, K. (2012). Reduced White Matter Volume Associated with Childhood Lead Exposure. 50th Annual Meeting of the American Society of Neuroradiology, New York, NY, April 21–26. O-506

11. **Beckwith, T.**, Cecil, K., Dietrich, K. (2012). Sex Differences in Diffusion Tensor Imaging Metrics in Adults with Childhood Lead Exposure. 50th Annual Meeting of the American Society of Neuroradiology, New York, NY, April 21–26. O-507

12. Webber, E.S., **Beckwith, T.J.**, Peña, S.R., Cromwell, H.C. (2009). Selective Breeding for Differential Emissions of 50 kHz Ultrasonic Vocalizations: An Examination of Social Recognition and Fear Conditioning. Poster presented at 39th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 17–21. 191.16/EE79

13. Webber, E.S., **Beckwith, T.J.** (2008). Prepulse Inhibition in Rats Selectively Bred for Differential Ultrasonic Vocalization Emission. Poster presented at 38th Annual Meeting of the Society for Neuroscience, Washington, DC, November 15–19. 883.11/TT87
14. McFarland, A.M., **Beckwith, T.J.**, Greenwald, M., Cromwell, H.C. (2008). Effect of Variation in Maternal Care on Early Social Motivation in Rat Pups. Poster presented at 38th Annual Meeting of the Society for Neuroscience, Washington, DC, November 15–19. 795.18/UU36
15. McFarland, A.M., Greenwald, M., **Beckwith, T.J.**, Cromwell, H.C. (2008). The Effects of Natural Fluctuations in Early Maternal Care on Social Motivation in Young Rats. Poster presented at the 20th Annual Convention of the American Psychological Society, Chicago, IL, May 22–25
16. Harmon, K.H., Greenwald, M., McFarland, A.M., **Beckwith, T.J.**, Cromwell, H.C. (2007). The Effects of Mild Prenatal Stress on Offspring Social Motivation. Poster presented at the 37th Annual Meeting of the Society for Neuroscience, San Diego, CA, November 3–7. 644.12/III27
17. McFarland, A.M., **Beckwith, T.J.**, Jolous-Jamshidi, B., Cromwell, H.C., and Meserve, L.A. (2007). Effect of Polychlorinated Biphenyls on Ultrasonic Vocalizations. Poster presented at Annual Bowling Green State University Research Conference, Bowling Green, OH. Also presented at Bowling Green State University Psychology Undergraduate Research Symposium, Bowling Green, OH
18. Harmon, K.H., McFarland, A.M., Greenwald, M., **Beckwith, T.J.**, Cromwell, H.C. (2007). Mild Prenatal Stress Exposure Disrupts Rat Pup Preference for a Maternally Associated Odor. Poster presented at 14th Annual University of Toledo/Bowling Green State University Symposium on Research in Psychiatry, Psychology & Behavioral Science, Toledo, OH. Also presented at the 5th Annual University of Toledo Neuroscience Research Day, Toledo, OH

TEACHING & TRAINING

Neuroimaging Methods Training | 2015–2024

- Served as the de facto neuroimaging methods resource across multiple postdoctoral lab settings, providing individual and small-group training to graduate and summer research students on FSL, AFNI, FreeSurfer, and ImageJ, processing pipeline procedures, and foundational command-line and scripting practices.
- Delivered lab meeting presentations demonstrating neuroimaging tools, pipeline logic, and analysis methods to research teams.
- Oriented new lab members on data access, server navigation, and file organization practices for neuroimaging workflows.
- Authored technical processing manual for MRI_Analysis_Calculator ImageJ plugin, standardizing analysis procedures for lab implementation.
- Provided ongoing methodology consultation to research team members on analysis approaches, software selection, and data management practices.

Teaching Assistant | 2011–2013
Excellence in Science and Learning Program (ExSEL) | University of Cincinnati College of Medicine & Howard Hughes Medical Institute

- Developed and delivered original STEM curriculum over multiple years, including presentations, laboratory exercises, and interactive activities for cohorts of 20 academically selected high school students.
- Mentored and supervised 4 graduate teaching assistants on classroom management and teaching strategies.
- Managed scheduling and logistics for research faculty presentations.

Teaching Assistant | 2012
Fundamentals of Neuroscience I | University of Cincinnati College of Medicine

- Served as a teaching assistant under faculty mentorship as part of the Preparing Future Faculty certificate program, gaining formal training in course design and pedagogy.
- Led discussion sections, laboratory activities, and study sessions for first-year neuroscience graduate students.
- Collaborated with course directors in the development and delivery of neuroanatomy laboratory exercises.

Springboard Coach | 2008
Springboard Program | Bowling Green State University, Bowling Green, OH

- Provided one-on-one mentorship to first-year students as part of a structured peer mentoring program, supporting their transition to university life through guidance on academic advising, time management, and stress management.
- Facilitated group activities and delivered presentations on effective study habits and available campus resources.

MEDIA COVERAGE

Selected media, legal, and policy coverage of Beckwith et al. (2021), "Criminal Arrests Associated with Reduced Regional Brain Volumes in an Adult Population with Documented Childhood Lead Exposure," *Environmental Research*:

Federal Litigation

> Brief of American Academy of Pediatrics, et al. as Amici Curiae in Support of Respondents. *American Water Works Association v. United States Environmental Protection Agency*, No. 24-1376, U.S. Court of Appeals for the D.C. Circuit. Filed April 17, 2026. https://www.nrdc.org/sites/default/files/2026-04/2026-04-17_AAP_Corrected_Final_Amicus_Brief.pdf

Legal & Policy Citations

Cykosky, Phoebe. "'We Plead Lead': How Lead Painted Juvenile Crime Rates in the 1990's." *Vermont Law Review Blog*, May 2, 2025. https://lawreview.vermontlaw.edu/we-plead-lead-how-lead-painted-juvenile-crime-rates-in-the-1990s/

Institutional Coverage

"Long-Term Study Documents Link Between Adult Crime and Brain Damage from Childhood Lead Exposure." *Research Horizons*, Cincinnati Children's Hospital Medical Center, October 25, 2021. https://scienceblog.cincinnatichildrens.org/long-term-study-documents-link-between-adult-crime-and-brain-damage-from-childhood-lead-exposure/

Selected international and national media coverage of Beckwith et al. (2020), "Reduced Cortical Thickness Associated with Traffic-Related Air Pollution in a Longitudinally Studied Pediatric Cohort," *PLoS One*:

1. "Heavy traffic pollution may affect kids' brain development." Linda Carroll, *Reuters*, January 28, 2020. https://www.reuters.com/article/us-health-pollution-brain-development-idUSKBN1ZR2KG
2. "High air pollution exposure in 1-year-olds linked to structural brain changes at age 12." *Neuroscience News*, January 26, 2020. https://neurosciencenews.com/air-pollution-brain-changes-15565/
3. "Babies who live near heavily polluted roads have 'less grey matter in their brains' by the age of 12, study finds." Harry Howard, *Daily Mail*, January 25, 2020. https://www.dailymail.co.uk/health/article-7924721/Babies-live-near-heavily-polluted-roads-developed-brains-age-12-study-finds.html
4. "Pollution from traffic fumes can impair children's sight by shrinking their brains." Tom Bawden, *i*, January 24, 2020. https://inews.co.uk/news/environment/pollution-early-exposure-traffic-fumes-sight-shrinking-brains-389887
5. "MRI shows air pollution effect on kids' brain development." Wayne Forrest, *AuntMinnie*, January 24, 2020. https://www.auntminnie.com/clinical-news/mri/article/15625115/mri-shows-air-pollution-effect-on-kids-brain-development
6. "High air pollution exposure in 1-year-olds linked to structural brain changes at age 12." *ScienceDaily*, January 24, 2020. https://www.sciencedaily.com/releases/2020/01/200124155107.htm

Additional coverage appeared in *PsychCentral*, *Deccan Herald*, *The London Economic*, *Air Quality News*, *Medindia*, *Green Car Congress*, *The Hawk*, and *BreezoMeter* (links no longer active).

SERVICE AND LEADERSHIP

Leadership & Committee Involvement

Student Representative | 2012–2013 Neuroscience Graduate Program Admissions Committee | University of Cincinnati College of Medicine

- Proposed and established the student representative position within the NGP by making the case directly to program directors and faculty.

- Evaluated NGP applicants through interviews and assessments, contributing to the student selection process.
- Gathered and presented feedback from current NGP students regarding applicant interactions, providing insights to the admissions committee.

Student Representative | 2012–2013 Network for Neuroscience Discovery Steering Committee | University of Cincinnati College of Medicine

- Invited by NGP directors and faculty to join the Steering Committee following the establishment of the student representative role in the admissions process.
- Presented research to prospective donors, communicating the scientific mission and impact of the program to non-specialist audiences.
- Participated in discussions on the allocation of newly awarded institutional funding, contributing a student perspective to program-level budget decisions.

Graduate Student Recruiter | 2009–2011
Neuroscience Graduate Program | University of Cincinnati College of Medicine

- Served as a point of contact for recruits, fielding questions about the NGP, graduate student life, and living in Cincinnati.
- Facilitated NGP recruitment activities, including escorting candidates to interviews and events.
- Provided feedback on recruitment strategies and candidate assessments to the NGP Admissions Committee.

Grant Review & Judging

Pilot Project Program Reviewer | 2020
Center for Integrative Environmental Health Sciences (CIEHS) | NIEHS P30 Environmental Health Sciences Core Center | University of Louisville

- Reviewed and scored a pilot grant application submitted to a NIEHS-funded Environmental Health Sciences Core Center, evaluating scientific merit and feasibility.

Poster Session Judge | 2019
40th Annual Graduate Student Research Forum | University of Cincinnati College of Medicine

Manuscript Review

Ad Hoc Manuscript Reviewer for:

- *Environment International*
- *NeuroImage*

- *Physiology & Behavior*
- *Psychiatry Research: Neuroimaging*
- *The Lancet Planetary Health*

Professional Affiliations

- American Association for the Advancement of Science (2020—2021)
- Developmental Neurotoxicology Society (2020—2021)
- Indiana Academy of Science (2024—2025)
- National Postdoctoral Association (2018—2021)
- Ohio Miami Valley Society for Neuroscience (2015—2021)
- Society for Epidemiologic Research (2020—2021)
- Society for Neuroscience (2009—2024)