Stanford

Phillip Kyriakakis

Temp - Non-Exempt, Psychiatry and Behavioral Sciences - Child & Adolescent Psychiatry and Child Development

Bio

BIO

Phillip Kyriakakis, Ph.D. is a Senior Research Scientist in the Bioengineering Department at Stanford University in the Wu Tsai Institute for Neuroscience. Dr. Kyriakakis did his undergraduate work in Biochemistry at UMass Boston, where he also worked in Dr. Alexey Veraksa's developmental biology lab and started to develop PhyB optogenetics in animal cells (2008). Dr. Kyriakakis continued his education at UC San Diego in the Division of Biological Sciences. There, he studied cellular programming and metabolism to obtain his degree with a specialization in Multiscale Biology. Dr. Kyriakakis did his postdoctoral work in the Bioengineering Department at UC San Diego with Todd Coleman, continuing the development of optogenetic tools and related technologies. In 2021 Dr. Kyriakakis moved to his Senior Research Scientist role at Stanford University in the Bioengineering Department at the Wu Tsai Institute for Neurosciences.

Professional

PROFESSIONAL INTERESTS

I am interested in building tools to study biology. In the process of engineering, it is often the case that a better understanding of the system is needed to build it or to optimize new tools. Thus, tool building at the cutting edge is often a combination of exploration and engineering, a combination that I find very exciting. My interests are to develop tools with capabilities far beyond what exists today and to apply them to understand important biological phenomena. Further, I aim to make these tools as accessible as possible to other researchers that want to use them or improve on them. I enjoy being a part of the scientific community where we can work together openly to maximize the impact of our work.

My specific interests constantly change as new challenges arise. Starting by developing new optogenetic tools for controlling genes or other biological processes, I found bottlenecks to apply them more broadly, (1) delivering large genes or multipart genetic circuits and (2) assembling these genetic circuits (3) the need for low-cost illumination systems. To improve these, our team is developing (1) novel viral systems and (2) DNA assembly systems. In addition, we developed an inexpensive ($200-$700) computer controllable LED illumination system with detailed step-by-step instructions so that it can be built without prior experience in building electronics (https://www.jove.com/t/61914). In addition to these projects, we are also developing automated platforms for rapid customization and optimization of these tools.

Publications

PUBLICATIONS

- **Current and emerging tools for studying animal models of sleep and autism.** *Journal of psychiatric research*
  Kyriakakis, P., Gonzalez, O. C.
  2025; 193: 283-301
- **Light-Guided Rabies Virus Tracing for Neural Circuit Analysis** *bioRxiv*
  Zhang, S., Ma, Y., Ngamkanjanarat, W., Takahashi, S., Gibbs, D., Coleman, T., Doan, S., Kyriakakis, P.

2023

- **Lipopolysaccharide-induced maternal immune activation modulates microglial CX3CR1 protein expression and morphological phenotype in the hippocampus and dentate gyrus, resulting in cognitive inflexibility during late adolescence.** *Brain, behavior, and immunity*
  Fernandez de Cossio, L., Lacabanne, C., Bordeleau, M., Castino, G., Kyriakakis, P., Tremblay, M.
  2021

- **Building a Simple and Versatile Illumination System for Optogenetic Experiments** *JOVE-JOURNAL OF VISUALIZED EXPERIMENTS*
  Kyriakakis, P., de Cossio, L., Howard, P., Kouv, S., Catanho, M., Hu, V. J., Kyriakakis, R., Allen, M. E., Ma, Y., Aguilar-Rivera, M., Coleman, T. P.
  2021

- **Engineering light-controllable CAR T cells for cancer immunotherapy** *SCIENCE ADVANCES*
  Huang, Z., Wu, Y., Allen, M. E., Pan, Y., Kyriakakis, P., Lu, S., Chang, Y., Wang, X., Chien, S., Wang, Y.
  2020; 6 (8): eaay9209

- **An AND-Gated Drug and Photoactivatable Cre-loxP System for Spatiotemporal Control in Cell-Based Therapeutics** *ACS SYNTHETIC BIOLOGY*
  Allen, M. E., Zhou, W., Thangaraj, J., Kyriakakis, P., Wu, Y., Huang, Z., Phuong Ho, Pan, Y., Limsakul, P., Xu, X., Wang, Y.
  2019; 8 (10): 2359-2371

- **Biosynthesis of Orthogonal Molecules Using Ferredoxin and Ferredoxin-NADP(+) Reductase Systems Enables Genetically Encoded PhyB Optogenetics** *ACS SYNTHETIC BIOLOGY*
  Kyriakakis, P., Catanho, M., Hoffner, N., Thavarajah, W., Hu, V. J., Chao, S., Hsu, A., Pham, V., Naghavian, L., Dozier, L. E., Patrick, G. N., Coleman, T. P.
  2018; 7 (2): 706-717

- **Medium-scale Preparation of Drosophila Embryo Extracts for Proteomic Experiments** *JOVE-JOURNAL OF VISUALIZED EXPERIMENTS*
  Yang, L., Paul, S., DuBois-Coyne, S., Kyriakakis, P., Veraksa, A.
  2017

- **Heparin Mimicking Polymer Promotes Myogenic Differentiation of Muscle Progenitor Cells** *BIOMACROMOLECULES*
  Sangaj, N., Kyriakakis, P., Yang, D., Chang, C., Arya, G., Varghese, S.
  2010; 11 (12): 3294-3300

- **beta-arrestin Kurtz inhibits MAPK and Toll signalling in Drosophila development** *EMBO JOURNAL*
  Tipping, M., Kim, Y., Kyriakakis, P., Tong, M., Shvartsman, S. Y., Veraksa, A.
  2010; 29 (19): 3222-3235

- **Tandem affinity purification in Drosophila - The advantages of the GS-TAP system** *FLY*
  Kyriakakis, P., Tipping, M., Abed, L., Veraksa, A.
  2008; 2 (4): 229-235