OMB No. 3145-0279 (Expiration Date 10/31/2026)

NIH BIOGRAPHICAL SKETCH COMMON FORM

Name: Long, Timothy

Persistent Identifier (PID) of the Senior/Key Person: https://orcid.org/0000-0003-0213-4726

Position Title: Associate Professor

Organization and Location: Marshall University School of Pharmacy, Huntington, WV, United States

PROFESSIONAL PREPARATION

INSTITUTION AND LOCATION	DEGREE	Start Date	Completion Date	FIELD OF STUDY
University of Notre Dame, Notre Dame, IN, USA	Postdoctoral Fellow	01/2004	08/2006	Chemistry
University of South Florida, Tampa, FL, USA	DOCTOR OF PHILOSOPHY	08/1999	12/2003	Chemistry
University of South Florida, Tampa, FL, USA	BACHELOR OF SCIENCE	06/1995	08/1999	Biology

Appointments and Positions

2019 - present	Associate Professor, Marshall University School of Pharmacy, Huntington, WV, United States
2025 - 2025	Ad Hoc Reviewer, NIH CSR Special Emphasis Panel ZRG1 DCAI-U (02) Member Conflict: Topics in Fungal, Parasitic, and Bacterial Disease, Center for Scientific Review, Bethesda, MD, United States
2025 - 2025	Ad Hoc Reviewer, ZAI1 KLM-D (M1) Support for Research Excellence (SuRE) Award (R16) Clinical Trial Not Allowed) and Support for Research Excellence First Independent Research (SuRE-First) Award, NIAID Special Emphasis Panel, Bethesda, MD, United States
2025 - 2025	Ad Hoc Reviewer, Military Infectious Disease Research Program, Wounds Panel (W-1), Military Infectious Diseases Research Program (MIDRP), Fort Detrick, MD, United States
2024 - 2024	Ad Hoc Reviewer, NIH ZAI1 VSR-D (M1) NIAID New Innovators Awards (DP2 Clinical Trial Not Allowed), NIAID Special Emphasis Panel, Bethesda, MD, United States
2024 - 2024	Ad Hoc Reviewer, Military Infectious Disease Research Program, Wounds Panel (W-1), Military Infectious Diseases Research Program (MIDRP), Fort Detrick, Maryland, United States
2023 - 2023	Ad Hoc Reviewer, Infection Control and Prevention Panel (ICM-1), Defense Medical Research and Development Program (DMRDP) , Bethesda, MD, United States
2023 - 2023	Ad Hoc Reviewer, NIH ZAI1 MMO-D (J1) Support for Research Excellence (SuRE) Award (R16 Clinical Trial Not Allowed), NIAID Special Emphasis Panel, Bethesda, MD, United States

Products

Products Closely Related to the Proposed Project

1. Long TE, Naidu ST, Hissom EG, Meka Y, Chavva H, Brown KC, Valentine ME, Fan J, Denvir J, Primerano DA, Yu HD, Valentovic MA. Disulfiram induces redox imbalance and perturbations in central glucose catabolism and metal homeostasis to inhibit the growth of Staphylococcus aureus. Sci Rep. 2025 May 5;15(1):15658. PubMed Central PMCID: PMC12053631.
2. Evans SE, Valentine ME, Gallimore F, Meka Y, Koehler SI, Yu HD, Valentovic MA, Long TE. Perturbations in the gut microbiome of C57BL/6 mice by the sobriety aid Antabuse® (disulfiram). J Appl Microbiol. 2025 Jan 6;136(1) PubMed Central PMCID: PMC11704607.
3. Chavva H, Meka Y, Long TE. Antimicrobial pharmacodynamics of vancomycin and disulfiram (Antabuse®) in Staphylococcus aureus. Front Microbiol. 2022;13:1092257. PubMed Central PMCID: PMC9854118.
4. Shanholtzer CN, Rice C, Watson K, Carreon H, Long TE. Effect of copper on the antifungal activity of disulfiram (Antabuse®) in fluconazole-resistant Candida strains. Med Mycol. 2022 Mar 17;60(4) PubMed Central PMCID: PMC8929679.
5. Lewis AD, Riedel TM, Kesler MBA, Varney ME, Long TE. Pharmacological evaluation of disulfiram analogs as antimicrobial

agents and their application as inhibitors of fosB-mediated fosfomycin resistance. J Antibiot (Tokyo). 2022 Mar;75(3):146-154. PubMed Central PMCID: PMC8852335.

Other Significant Products Highlighting Contributions to Science

1. Karuturi S, Jobe KL, Varney ME, Hambuchen MD, Amin ARMR, Long TE. Optimization of (Dithioperoxo)thiolate-Based Antifungal Agents for Triazole-Resistant Aspergillus Fumigatus. Pathogens. 2025 Sep 3;14(9) PubMed Central PMCID: PMC12472219.
2. Das PV, Valentine ME, Long TE, Yu HD. Attenuated Strains of Pseudomonas aeruginosa: A Promising Cell Factory for Rhamnolipid Production. Microb Biotechnol. 2025 Nov;18(11):e70239. PubMed Central PMCID: PMC12588882.
3. Brown KC, Modi KJ, Light RS, Cox AJ, Long TE, Gadepalli RS, Rimoldi JM, Miles SL, Rankin G, Valentovic M, Denning KL, Tirona MT, Finch PT, Hess JA, Dasgupta P. Anticancer Activity of Region B Capsaicin Analogs. J Med Chem. 2023 Apr 13;66(7):4294-4323. PubMed Central PMCID: PMC10108357.
4. Valentine ME, Kirby BD, Withers TR, Johnson SL, Long TE, Hao Y, Lam JS, Niles RM, Yu HD. Generation of a highly attenuated strain of Pseudomonas aeruginosa for commercial production of alginate. Microb Biotechnol. 2020 Jan;13(1):162-175. PubMed Central PMCID: PMC6922527.
5. Kirby BD, Al Ahmar R, Withers TR, Valentine ME, Valentovic M, Long TE, Gaskins JR, Yu HD. Efficacy of Aerosolized Rifaximin versus Tobramycin for Treatment of Pseudomonas aeruginosa Pneumonia in Mice. Antimicrob Agents Chemother. 2019 Jul;63(7) PubMed Central PMCID: PMC6591630.

Certification:

I certify that the information provided is current, accurate, and complete. This includes but is not limited to information related to domestic and foreign appointments and positions.

I also certify that, at the time of submission, I am not a party to a malign foreign talent recruitment program.

Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

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NIH BIOGRAPHICAL SKETCH SUPPLEMENT

Name: Long, Timothy

Persistent Identifier (PID) of the Senior/Key Person: https://orcid.org/0000-0003-0213-4726

Position Title: Associate Professor

Organization and Location: Marshall University School of Pharmacy, Huntington, WV, United States

Personal Statement

I am an Associate Professor of Pharmaceutical Sciences whose research program focuses on the discovery and development of novel therapeutics targeting antimicrobial-resistant infections. My training integrates chemistry and microbiology, with expertise in synthetic medicinal chemistry, structural characterization (NMR, HPLC, GC–MS, LC–MS), and antimicrobial pharmacology. My laboratory conducts cross-disciplinary research to identify and advance new mechanistic classes of anti-infective agents, with particular emphasis on vancomycin-resistant bacteria and azole-resistant fungi. Current projects include the rational design and synthesis of small-molecule antimicrobials that disrupt cell envelope integrity and metabolic pathways in drug-resistant pathogens, development of mitochondria-targeted bioactive compounds with selective toxicity toward microbial cells, and investigation of microbially derived bioactive lipids and surfactants as antimicrobial and immunomodulatory agents. Collectively, these studies aim to overcome established resistance mechanisms by targeting underexploited biological vulnerabilities and by enabling new strategies for drug delivery and host–pathogen modulation. I have published peer-reviewed studies describing the design, synthesis, and pharmacological evaluation of compounds active against these high-priority organisms such as MRSA and fluconazole-resistant Candida. This work has been conducted in close collaboration with undergraduate, Pharm.D., M.S., and Ph.D. trainees, reflecting my sustained commitment to research-driven education and workforce development in the biomedical sciences. Through these efforts, I have established a productive training environment that provides students with opportunities to gain hands-on experience in translational drug discovery.

Honors

2020	Dean's Award for Research Excellence, Marshall School of Pharmacy, Marshall University
2018	Instructor of the Year Award, P2 Class, Marshall School of Pharmacy
2017	Instructor of the Year Award, P2 Class, Marshall School of Pharmacy
2013	Faculty of the Year, Phi Delta Chi Professional Pharmacy Fraternity, Alpha Iota Chapter
2012	Faculty of the Year, Phi Delta Chi Professional Pharmacy Fraternity, Alpha Iota Chapter
2002	Fred L. & Helen M. Tharp Outstanding First Year Graduate Student Award, Department of Chemistry, University of South Florida

Contributions to Science

1. Since 2013, my laboratory at Marshall University has maintained a sustained focus on antimicrobial drug discovery, resulting in peer-reviewed original research articles and reviews in this area. Our current work centers on the repurposing of disulfiram (Antabuse™) and related disulfide-containing compounds as antimicrobial adjuvants for the treatment of bacterial and fungal infections. In Staphylococcus aureus, we demonstrated that disulfiram reduces the minimum inhibitory concentration (MIC) of vancomycin in vancomycin-intermediate S. aureus (VISA) to MIC and sub-MIC levels comparable to those observed in methicillin-resistant S. aureus (MRSA) (Chavva et al. 2022). Integrated differential transcriptomic, metabolomic, bioenergetic, and phenotypic growth analyses revealed that disulfiram inhibits bacterial proliferation through disruption of central carbon metabolism, particularly glucose catabolism, and induction of redox imbalance consistent with oxidative stress (Long et al. 2025). Furthermore, chelation of essential metal ions and antagonism of the respiratory chain by its primary metabolite were shown to further impair cellular bioenergetics and replication, supporting a multifactorial mechanism of antimicrobial potentiation.

2. Since 2014, I have maintained an active research collaboration with Dr. Hongwei Yu at Marshall University focused on developing new therapeutic strategies against mucoid Pseudomonas aeruginosa. This work has included evaluating synthetic anionic fluoroquinolones engineered to improve penetration of alginate-rich biofilms and investigating aerosolized rifaximin as an antibiotic adjuvant for treating Pseudomonas infections associated with cystic fibrosis (Kirby et al. 2019) I have also

contributed to collaborative projects involving the bioengineering of P. aeruginosa–derived alginate (Valentine et al. 2020) and rhamnolipids (Das et al. 2025) Across these efforts, I provide analytical expertise to rigorously validate the structure and composition of bioengineered materials using high-performance liquid chromatography (HPLC), mass spectrometry (MS), and Fourier-transform infrared spectroscopy (FT-IR), strengthening quality control and interpretation of downstream biological results.

3. As a Ph.D. student and later as a faculty member, I have collaborated extensively with cancer researchers on the rational design and synthesis of bioactive small molecules targeting multiple malignancies. During my doctoral training, I synthesized antineoplastic compounds incorporating the β-lactam ring system, which were evaluated in human cancer models in Dr. Q. Ping Dao's laboratory at the H. Lee Moffitt Cancer Center & Research Institute (Chen et al., 2008; Kazi et al., 2004). As a faculty member, my laboratory designed and synthesized novel haloenol morpholinones as anticancer agents in collaboration with Dr. Brian Cummings at the University of Georgia. Analogs derived from L- and D-phenylglycine were among the most potent inhibitors of LNCaP and PC-3 prostate cancer cell proliferation (Mock et al., 2012). Mechanistic studies demonstrated that these compounds induced G2/M cell-cycle arrest, and that the (S)-enantiomer selectively inhibited cytosolic iPLA2β. At Marshall University, I maintain an active collaboration with Dr. Ruhul Amin's group focused on developing therapeutics for head-and-neck and lung cancers (Adeluola et al., 2022). In addition, I collaborate with Dr. Piyali Dasgupta's laboratory on the synthesis and biological evaluation of non-pungent capsaicin analogs as irinotecan adjuvants for lung cancer therapy (Brown et al., 2023). Collectively, this body of work demonstrates sustained expertise in medicinal chemistry, mechanism-guided lead optimization, and collaborative pharmacologic evaluation of small-molecule therapeutics.

4. From 2009 to 2012, my laboratory investigated phosphonium cation derivatives of electron-transport inhibitors as antiparasitic agents. We designed protozoal coenzyme Q antagonists to exploit electrostatic attraction to the negatively charged mitochondrial membrane in parasitic organisms, based on the central hypothesis that charge-mediated mitochondrial accumulation would enhance therapeutic efficacy (Long et al., 2012). We further postulated that selectively targeting antagonists to the mitochondrion would reduce parasite exposure to sublethal drug concentrations that can drive resistance, including mutations in coenzyme-binding sites. In collaboration with the Rosenthal laboratory at the University of California, San Francisco, we demonstrated that the pharmacological properties of naphthoquinone-based antimalarials can be enhanced by conjugation to a phosphonium moiety (Lu et al., 2012). These findings support targeted mitochondrial delivery as a viable strategy to increase antiprotozoal potency while mitigating the risk of resistance development.

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