

BIOGRAPHICAL SKETCH

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NAME: Thorne, Peter S.

eRA COMMONS USER NAME (agency login): PTHORNE

POSITION TITLE: Professor and Department Head

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Wisconsin, Madison, WI	BS	09/1978	Chemical Engineering
University of Wisconsin, Madison, WI	MS	05/1980	Biomedical Engineering
University of Wisconsin, Madison, WI	PHD	07/1984	Environmental Toxicology
University of Pittsburgh, Pittsburgh, PA	Postdoctoral Fellow	03/1987	Immunotoxicology

A. Personal Statement

The experience I bring to this grant application has been amassed through over three decades of NIH-funded research in bioaerosols science, inhalation toxicology, environmental epidemiology of pulmonary diseases and exposure assessment. I have served as Director of a P30 Center focused on environmental lung disease for 17 years and director of the Pulmonary Toxicology Facility core for 25 years. I have served as Department Head for 7 years. Further experience as a member of the National Academy of Sciences, Board on Environmental Studies and Toxicology and as Chair of the EPA Chartered Science Advisory Board have helped me gain insight into the translation of biomedical research to protect the health of the public. My laboratory group performs seminal research in toxicology and epidemiology as described below and has provided exposure assessment for biological agents for over 50 studies including NHANES.

1. **Thorne PS**, Mendy A, Metwali N, Salo P, Co C, Jaramillo R, Rose KM, Zeldin DC. Endotoxin exposure: predictors and prevalence of associated asthma outcomes in the U.S. *Am J Respir Crit Care Med*. 2015 Dec 1;192(11):1287-97. First published online 10 Aug 2015. PMID: [26258643](#); PMCID: [PMC4731700](#)
2. Stein MM, Hrusch CL, Gozdz J, Igartua C, Pivniouk V, Murray SE, Ledford JG, Marques dos Santos M, Anderson RL, Metwali N, Neilson JW, Maier RM, Gilbert JA, Holbreich M, **Thorne PS**, Martinez FD, von Mutius E, Vercelli D, Ober C, Sperling AI. Innate Immunity and Asthma Risk in Amish and Hutterite Farm Children. *N Engl J Med*. 2016 Aug 4;375(5):411-21. PMID: [27518660](#); PMCID: [PMC5137793](#)
3. Mendy A, Wilkerson J, Salo PM, Cohn RD, Zeldin DC, **Thorne PS**. Endotoxin predictors and associated respiratory outcomes differ with climate regions in the U.S. *Environ Int*. 2017 Dec 22;112:218-226. doi: 10.1016/j.envint.2017.12.003. [Epub ahead of print] PMID: [29277065](#)
4. Salo PM, Wilkerson J, Rose KM, Cohn RD, Calatroni A, Mitchell HE, Sever ML, Gergen PJ, **Thorne PS**, Zeldin DC. Bedroom allergen exposures in US households. *J Allergy Clin Immunol*. 2017 Nov 23. pii: S0091-6749(17)31590-7. doi: 10.1016/j.jaci.2017.08.033. [Epub ahead of print] PMID: [29198587](#)

B. Positions and Honors**Positions and Employment**

1978 - 1982	Research Assistant, University of Wisconsin, Madison, WI
1982 - 1984	National Research Service Award Trainee, University of Wisconsin, Madison, WI
1984 - 1987	Faculty Research Associate, University of Pittsburgh, Pittsburgh, PA
1987 - 1988	Assistant Professor, University of Pittsburgh, Pittsburgh, PA
1988 - 1992	Assistant Professor, University of Iowa, Iowa City, IA
1992 - 1997	Associate Professor, University of Iowa, Iowa City, IA
1993 - present	Director, U.I. Pulmonary Toxicology Facility, Iowa City, IA
1993 - 2000	Deputy Director, Environmental Health Sciences Research Center, Iowa City, IA
1997 - present	Professor of Environmental Engineering, College of Engineering (Secondary), University of Iowa, Iowa City, IA

1997 - 1999 Professor of Toxicology, College of Medicine, University of Iowa, Iowa City, IA
 1998 - 1998 Visiting Professor, Wageningen University, Wageningen, The Netherlands
 1999 - present Professor of Toxicology, College of Public Health, University of Iowa, Iowa City, IA
 2000 - present Director, Environmental Health Sciences Research Center, Iowa City, IA
 2006 - 2007 Visiting Professor, Utrecht University, Utrecht, The Netherlands
 2007 - 2007 Visiting Professor, Aarhus University, Aarhus, Denmark
 2009 - 2010 Acting Head, UI Department of Occupational & Environmental Health, Iowa City, IA
 2010 - present Head, UI Department of Occupational & Environmental Health, Iowa City, IA

Other Experience and Professional Memberships

1986- various Member, Society of Toxicology, American Society for Microbiology, American Industrial Hygiene Association, American Thoracic Society, British Occupational Hygiene Society, European Respiratory Society
 1993-present Member, NIEHS, NIOSH, EPA ad hoc review groups
 1997-1998 NIH-EPA-FDA, Interagency Coordinating Committee on the Validation of Alternative Methods
 1999-2002 Member, NIOSH Occupational Health Study Section
 2000-2002 Chair, Society of Toxicology, Occupational Health Specialty Section
 2000-2007 Science Advisory Panel, Canadian Animal and Human Health Study of Oil and Gas Drilling
 2001-2001 Chair, NIOSH Occupational Health Study Section
 2003-2007 Member, NIH National Advisory Environmental Health Sciences Council
 2011-2017 Member & Chair (2015-2017), U.S. EPA Chartered Science Advisory Board,
 2013-present Member, National Academy of Sciences, Board on Environmental Studies & Toxicology
 2017-present Member, National Academy of Sciences, Committee on Toxicology

Honors

2003 Moira J. Whitehead Memorial Lecturer, Children's Hospital of Pittsburgh, UPMC
 2004 Thomas Bedford Memorial Prize, British Occupational Hygiene Society
 2009 Faculty Research Award, University of Iowa College of Public Health
 2010 John Doull Award, Society of Toxicology, Central States Chapter
 2010 Inductee, Delta Omega Honorary Public Health Society
 2013 Distinguished Faculty Award & Lecture, University of Iowa College of Public Health
 2017 Scholar of the Year Award, University of Iowa
 2018 Regents Award for Faculty Excellence, University of Iowa

C. Contribution to Science

1. My research has helped elucidate the role of inhaled endotoxin in lung inflammation, asthma and environmental and occupational lung and cardiac diseases.
 - a. Trompette A, Divanovic S, Visintin A, Blanchard C, Hegde RS, Madan R, **Thorne PS**, Wills-Karp M, Gioannini TL, Weiss JP, Karp CL. Allergenicity resulting from functional mimicry of a Toll-like receptor complex protein. *Nature*. 2009 Jan 29;457(7229):585-8. PMID: [19060881](#); PMCID: [PMC2843411](#).
 - b. **Thorne PS**, Cohn RD, Mav D, Arbes SJ, Zeldin DC. Predictors of endotoxin levels in U.S. housing. *Environ Health Perspect*. 2009 May;117(5):763-71. PMID: [19479019](#); PMCID: [PMC2685839](#).
 - c. Semple S, Devakumar D, Fullerton DG, **Thorne PS**, Metwali N, Costello A, Gordon SB, Manandhar DS, Ayres JG. Airborne endotoxin concentrations in homes burning biomass fuel. *Environ Health Perspect*. 2010 Jul;118(7):988-91. PMID: [20308032](#); PMCID: [PMC2920920](#).
 - d. Liu L, Urch B, Poon R, Szyszkowicz M, Speck M, Gold DR, Wheeler AJ, Scott JA, Brook JR, **Thorne PS**, Silverman FS. Effects of Ambient Coarse, Fine, and Ultrafine Particles and Their Biological Constituents on Systemic Biomarkers: A Controlled Human Exposure Study. *Environ Health Perspect*. 2015 Jun;123(6):534-40. Epub 2015 Jan 16. PMID: [25616223](#); PMCID: [PMC4455587](#)
2. My group has developed and optimized methodology for quantitative exposure assessment for endotoxin, glucans and allergens.

- a. **Thorne PS**, Perry SS, Saito R, O'Shaughnessy PT, Mehaffy J, Metwali N, Keefe T, Donham KJ, Reynolds SJ. Evaluation of the Limulus amebocyte lysate and recombinant factor C assays for assessment of airborne endotoxin. *Appl Environ Microbiol.* 2010 Aug;76(15):4988-95. PMID: [20525858](#); PMCID: [PMC2916455](#).
 - b. Kilburg-Basnyat B, Metwali N, **Thorne PS**. Effect of deployment time on endotoxin and allergen exposure assessment using electrostatic dust collectors. *Ann Occup Hyg.* 2015 Jan;59(1):104-15. PMID: [25187036](#); PMCID: [PMC4303768](#).
 - c. Hoppe Parr KA, Hadina S, Kilburg-Basnyat B, Wang Y, Chavez D, **Thorne PS**, Weiss JP. Modification of sample processing for the Limulus amebocyte lysate assay enhances detection of inflammogenic endotoxin in intact bacteria and organic dust. *Innate Immun.* 2017 Apr;23(3):307-318. Epub 2017 Jan 1. PMID: [28599265](#); PMCID:[PMC5814115](#)
 - d. Kilburg-Basnyat B, Peters TM, Perry SS, **Thorne PS**. Electrostatic dust collectors compared to inhalable samplers for measuring endotoxin concentrations in farm homes. *Indoor Air.* 2015 Aug 22. [Epub ahead of print] PMID: [26296624](#); PMCID:[PMC4850132](#)
3. Through *in vivo* inhalation toxicology studies and advanced *in vitro* methods, my research has shown that metal and metal oxide nanoparticles are less toxic than presumed compared to literature based on submerged cell culture studies.
- a. Adamcakova-Dodd A, Monick MM, Powers LS, Gibson-Corley KN, **Thorne PS**. Effects of prenatal inhalation exposure to copper nanoparticles on murine dams and offspring. *Part Fibre Toxicol.* 2015 Oct 6;12:30. PMID: [26437892](#); PMCID: [PMC4594905](#)
 - b. Jing X, Park JH, Peters TM, **Thorne PS**. Toxicity of copper oxide nanoparticles in lung epithelial cells exposed at the air-liquid interface compared with *in vivo* assessment. *Toxicol In Vitro.* 2015 Apr;29(3):502-11. PMID: [25575782](#); PMCID: [PMC4373347](#).
 - c. Adamcakova-Dodd A, Stebounova LV, O'Shaughnessy PT, Kim JS, Grassian VH, **Thorne PS**. Murine pulmonary responses after sub-chronic exposure to aluminum oxide-based nanowhiskers. *Part Fibre Toxicol.* 2012 Jun 19;9:22. PMID: [22713230](#); PMCID: [PMC3478979](#).
 - d. Kim JS, Peters TM, O'Shaughnessy PT, Adamcakova-Dodd A, **Thorne PS**. Validation of an *in vitro* exposure system for toxicity assessment of air-delivered nanomaterials. *Toxicol In Vitro.* 2013 Feb;27(1):164-73. PMID: [22981796](#); PMCID: [PMC3950355](#).
4. Work from my laboratory has shown that inhalation of lower-chlorinated polychlorinated biphenyls (PCBs) leads to rapid uptake, distribution and metabolism to OH-PCBs and PCB sulfates with associated immunotoxicity and endocrine disruption.
- a. Hu X, Adamcakova-Dodd A, Lehmler HJ, Hu D, Hornbuckle K, **Thorne PS**. Subchronic inhalation exposure study of an airborne polychlorinated biphenyl mixture resembling the Chicago ambient air congener profile. *Environ Sci Technol.* 2012 Sep 4;46(17):9653-62. PMID: [22846166](#); PMCID: [PMC3573703](#).
 - b. Hu X, Lehmler HJ, Adamcakova-Dodd A, **Thorne PS**. Elimination of inhaled 3,3'-dichlorobiphenyl and the formation of the 4-hydroxylated metabolite. *Environ Sci Technol.* 2013 May 7;47(9):4743-51. PMID: [23582014](#); PMCID: [PMC3962796](#).
 - c. Hu X, Adamcakova-Dodd A, **Thorne PS**. The fate of inhaled (14)C-labeled PCB11 and its metabolites *in vivo*. *Environ Int.* 2014 Feb;63:92-100. PMID: [24275706](#); PMCID: [PMC3950335](#).
 - d. Hu X, Adamcakova-Dodd A, Lehmler HJ, Gibson-Corley KN, **Thorne PS**. Toxicity evaluation of exposure to an atmospheric mixture of polychlorinated biphenyls by nose-only and whole-body inhalation regimens. *Environ Sci Technol.* 2015 Sep 8. [Epub ahead of print]. PMID: [26348937](#), [PMC4711378](#)
5. My AESOP Study, a longitudinal cohort study of exposures to PCBs among adolescent children and their mothers, has shown that nearly half the exposure to PCBs comes via inhalation and that indoor exposures in schools are particularly significant. There is also substantial exposure to non-legacy, non-Aroclor PCBs.
- a. Marek RF, **Thorne PS**, Wang K, Dewall J, Hornbuckle KC. PCBs and OH-PCBs in serum from children and mothers in urban and rural U.S. communities. *Environ Sci Technol.* 2013 Apr 2;47(7):3353-61. PMID: [23452180](#); PMCID: [PMC3645264](#).

- b. Marek RF, **Thorne PS**, DeWall J, Hornbuckle KC. Variability in PCB and OH-PCB serum levels in children and their mothers in urban and rural U.S. communities. *Environ Sci Technol*. 2014 Nov 18;48(22):13459-67. PMID: [25300024](#); PMCID: [PMC4238695](#).
- c. Ampleman MD, Martinez A, DeWall J, Rawn DF, Hornbuckle KC, **Thorne PS**. Inhalation and dietary exposure to PCBs in urban and rural cohorts via congener-specific measurements. *Environ Sci Technol*. 2015 Jan 20;49(2):1156-64. PMID: [25510359](#); PMCID: [PMC4303332](#).
- d. Koh WX, Hornbuckle KC, **Thorne PS**. Human Serum from Urban and Rural Adolescents and Their Mothers Shows Exposure to Polychlorinated Biphenyls Not Found in Commercial Mixtures. *Environ Sci Technol*. *Environ Sci Technol*. 2015 July 7; 49(13): 8105–8112. Published online 2015 June 18. PMID: [26053216](#); PMCID: [PMC4774248](#)

A full list of my published work is available at: <http://www.ncbi.nlm.nih.gov/sites/myncbi/1fET8FSy-d9Qa/bibliography/45504163/public/?sort=date&direction=ascending>

D. Research Support

Ongoing Research Support

- | | | |
|---|---------------------------|----------------------------|
| <p>U01 ES027252-01
NIH/NIEHS → University of Iowa
<i>Biological Response Profiles of Selected Engineered Nanomaterials after Perinatal Exposure</i>
This project will investigate the toxicity and biological response profiles of extensively characterized engineered nanomaterials supplied through the NHIR Consortium. We will perform in vitro and in vivo perinatal development studies.</p> | <p>Thorne (PI)</p> | <p>09/01/16-08/31/21</p> |
| <p>P30 ES005605-27
NIH/NIEHS → University of Iowa
<i>Environmental Health Sciences Research Center (EHSRC)</i>
The goal of the EHSRC is to promote research interactions among environmental health researchers at the UI, enhancing ongoing environmental health research and facilitating initiation of new collaborative and interdisciplinary environmental health research focused on rural populations.</p> | <p>Thorne (PI)</p> | <p>04/01/90-03/31/22</p> |
| <p>5 P42 ES013661-10
NIH/NIEHS → University of Iowa
<i>Superfund Research Program - Semi-volatile PCBs: Sources, Exposures, Toxicities</i>
<i>Project 6 – AESOP Study: Characterization of Exposures of Urban & Rural Cohorts to Airborne PCB's –</i>
Thorne: Project Leader
<i>Project 7 Assessment of Toxicity and Risk of Inhaled Environmental PCB Mixtures –</i> Thorne: Project Leader
The overall theme of the research is atmospheric sources of semivolatile PCBs and consequences of exposure. Studies include a community-based longitudinal cohort study of children and their mothers exposed to PCBs (Project 6) and inhalation toxicology studies of complex PCB mixtures (Project 7).</p> | <p>Robertson (PI)</p> | <p>04/01/05-03/31/20</p> |
| <p>R01 ES023510
NIH/NIEHS → University of Washington, Seattle
<i>Home Air in Agriculture; Pediatric Intervention Trail (HAPI)</i>
Thorne: PI of subaward
The purpose of this study is to address aggravating factors of pediatric asthma in a rural environment.</p> | <p>Karr (PI)</p> | <p>07/22/14 – 06/30/18</p> |
| <p>U01 AI110397-01A1
NIH/NIAID → Harvard Medical School, Boston
Thorne: PI of Subaward
<i>School Inner-City Asthma Intervention Study</i>
The purpose of this study is to determine the efficacy of school/classroom based environmental intervention in reducing asthma morbidity in urban schoolchildren.</p> | <p>Phipatanakul (PI)</p> | <p>01/01/16 – 12/31/19</p> |
| <p>R01 HL136813-01
NIH/NHLBI → University of Iowa
Thorne: Co-I
<i>Airway Alkalinization and Repurposing Tromethamine as a Therapeutic Approach in Cystic Fibrosis</i></p> | <p>Stoltz/Zabner (PI)</p> | <p>05/01/17 – 03/31/22</p> |

This project seeks to develop novel inhalation therapies for Cystic Fibrosis by safely correcting the pH imbalance of the airways that impairs innate immunity.

Completed Research Support

U01 AI083238 NIH/NIAID → Johns-Hopkins Univ., Baltimore Thorne: PI of Subaward <i>Mouse Allergen and Asthma Intervention Trial</i> The purpose of this subaward is to characterize exposures to innate immune modulations and indoor allergens in an intervention study of urban children that uses a mouse-allergen environmental intervention.	Matsui (PI)	05/15/10 – 04/30/16
HHSN-251201600522P; 6051-S11, & add-ons National Cancer Institute, DIR, Bethesda <i>Biological Effects of Exposures in Agriculture</i> Thorne: PI of Subaward The purpose of this study is to evaluate the potential role of endotoxin and glucan exposure in protection from lung cancer among farmers.	Beane Freeman (PI)	09/15/15 – 12/31/17
R01 AI059372 NIH/NIAID → University of Iowa Thorne: Co-Investigator <i>Regulation of MD-2 Function and Expression</i> The purpose of this study is to determine the role of MD-2 in innate immunity and to investigate its expression at the molecular level.	Weiss (PI)	07/01/10-06/30/15
P30 ES005605 (Supplement) NIH/NIEHS → University of Iowa <i>Exposure Assessment & Outreach to Engage the Public on Risk from Frac Sand Mining</i> In this study we are gathering exposure data, performing modeling, doing toxicology studies and engaging with the public to perform a human health risk assessment on the impacts of sand mining for use in hydraulic fracturing.	Thorne (PI)	04/01/13-03/31/16
P42 ES013661 (Supplement) NIH/NIEHS → University of Iowa <i>PCB RfC Inhalation Toxicology Study</i> This is an animal toxicology study of inhaled PCB mixtures to determine if whole-body and nose-only exposure systems result in similar PCB body burdens and to determine the RfC for inhaled PCBs.	Thorne (PI)	10/01/12-03/31/16
PHR-SUPS2-S-10-00179 NIH/NIEHS/Social and Scientific Systems, Inc. Laboratory Assays of Biological Agents in the Agricultural Health Study The purpose of this project is to perform approximately 10,000 laboratory assays for endotoxin, beta-glucan, and peptidoglycan from household samples of up to 3600 study participants.	Thorne (PI)	09/01/10-07/31/14
NHANES 200-2010-34238 CDC/NCHS → University of Iowa <i>Endotoxin Analysis of House Dust in NHANES</i> Extract and analyze 8,000 house dust samples from the NHANES Study for endotoxin and allergens to establish relationships between these exposures and asthma outcomes.	Thorne (PI)	04/15/10-08/16/13