

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person.

NAME Nancy Brenna Hopf (formerly Nilsen)		POSITION TITLE Group leader for Exposure Science group	
eRA COMMONS USER NAME			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
University of Oslo	MSc	1996	Synthetic Organic Chemistry
University of Cincinnati	PhD	2005-2009	Department of Occupational and Environmental health – Occupational hygiene Program – Specializing in Biological Monitoring

A. Personal Statement

I received my PhD in Occupational and Environmental Health, in the occupational hygiene program specializing in biological monitoring at the University of Cincinnati (UC), USA, and my MSc in organic chemistry from the University of Oslo, Norway. My current position is as a group leader of the Exposure Science group at the Institute for Work and Health (IST), Switzerland. Previous positions include evaluating toxicology, exposure, and epidemiological evidence for classification of carcinogens for the International Agency for Research Cancer (IARC) performing exposure assessments; retrospective exposure assessment for epidemiological occupational cohort studies at the National Institute for Work and Health (NIOSH) and risk assessments as a regulatory official for the Norwegian Directorate for Labour Inspection including representing Norway in EU labeling and risk assessment groups, and writing risk assessments (n-pentane and benzyl-butyl phthalates). My current research involves *biological monitoring* of volatile organic exposures among workers' and in volunteers exposed in controlled environments using an exposure chambers to understand the toxicokinetics and ultimately the best timing of the biological sampling after mixed exposures; *percutaneous penetration* of substances and UV in-vitro using a flow-through diffusion cells system to calculate time to penetration, penetration rate, and discover novel biomarkers in the skin; and more recently, *workplace exposures* to nanoparticles among cement workers, and indoor air quality among office workers.

B. Positions and Honors.Positions

2014-current	Group leader for Exposure Science Group at Institute for Work and Health (IST), Switzerland. Supervising and performing biomonitoring, applied toxicology, and skin in-vitro research, in addition to writing grant-proposals, leading research projects, and supervising PhD students.
2009-2014	Senior researcher at Institute for Work and Health (IST), Switzerland. Performing biomonitoring, applied toxicology, and skin in-vitro research, in addition to writing grant-proposals, leading research projects, and guiding PhD students.

- 2008-2009 Consultant for IARC (Lyon, France)
Organizing a workshop of cancer specialist to determine research recommendations for selected IARC-classified agents.
- 2003-2005 Research fellow (Title 42)
National Institute for Occupational Safety and Health (NIOSH) Industry Wide Studies Branch (IWSB) Industrial Hygiene (IH) section.
Biomonitoring of workers exposed to phthalates (DEP, DEHP, DBP)
- 2000-2002 Research fellow (Title 42)
National Institute for Occupational Safety and Health (NIOSH) Industry Wide Studies Branch (IWSB) Industrial Hygiene (IH) section.
Developing exposure matrices for former workers in the capacitor manufacturing industry exposed to polychlorinated biphenyl (PCB).
- 1997-2000 Senior chemist
Norwegian Directorate of Labour Inspection, Chemical Section
EU working groups: 1) risk assessment protocol (Technical Guidance Document), 2) risk assessments (n-pentane and benzyl butyl phthalate) in collaboration with the Norwegian Pollution Control and the Institute for Occupational Environment, 3) risk management 4) chemical legal acts
Administrative norms (occupational exposure limits) for chemicals in Norway. Assist Labour Inspection's industrial hygienists in investigation of chemical exposure characterizations.
- 1998-1999 Visiting Scientist with NIOSH, Cincinnati; Risk Evaluation Branch (4 months).
- 1996-1997 Chemist
Norwegian Directorate of Labour Inspection, Chemical Section
Control of import/export of chemical products and enforcement according to Norwegian Working Environment Act of 1977.
- 1996 Synthetic Chemist
Statens Næringsmiddeltilsyn (the Norwegian FDA)
Synthesis of standards used in the GC for testing content of chemical mixture
- 1996 English-Norwegian translator, Visual Software A/S
Translated computer software programs and documentation.
Laboratory supervisor, University of Oslo, Norway
1st year chemistry students in organic chemistry lab (KJ120)
- 1995 Laboratory supervisor, University of Oslo, Norway
1st year chemistry students in organic chemistry lab (KJ120)
- 1994 Laboratory supervisor, University of Oslo, Norway
Medical students in general and organic chemistry
- 1993 Laboratory supervisor, University of Oslo, Norway
Pharmacy-students in organic chemistry lab (KJ120)

Other Experience

- 2010 Workshop organized by the Swiss Federal Office of Public Health (FOPH), Services & Consultation on Alternative Methods (SeCAM), the European Centre for the Validation of Alternative Methods (ECVAM), the German Federal Institute For Risk Assessment (BfR), and the Orange House Partnership (OHP) the Workshop entitled "Regulatory assessment of in vitro data on skin corrosion and irritation within the European framework".
- 2010 XeRR Mini-Symposium on "Declining Male Fertility?"
- 2006 AIHce conference PDC Exposure Assessment Strategies and Statistics (2-day course)

- 2005 Principles of Ergonomics / 26-OSE-792
- 2004 Physical & Biological Aspects of Aerosols / 26-EIH-743
- 2004 Physical Aspects of the Environment / 26-EIH-790
- 2004 Principles of Occupational Exposure Assessment/26-EIH-707
- 2003 Medicinal Chemistry (Dr. Warner) at University of Cincinnati
- 2003 Practice of Occupational Exposure Assessment II/ 26-EIH-742
- 2003 Practice in Occupational Exposure Assessment I/ 26-EIH-741
- 2002 Biomonitoring (Dr. Talaska) at University of Cincinnati
- 2002 Review of Industrial Hygiene (ACGIH conference class)
- 2002 Introduction to Epidemiology (Dr. Buncher) at University of Cincinnati
- 2001 Introduction to Biostatistics (Dr. Buncher) at University of Cincinnati
- 1998 First international course on Molecular Epidemiology (NIVA: K. Husgafvel-Pursianinen and P. Boffetta)
- 1997 2nd Workshop on Risk Assessment Theory and Practice on Human Health. EU European Chemicals Bureau (ECB)
- 1997 Second International Course on Risk Assessment and Risk Management of the Working Environment (NIVA: E. Olsen and P. Laosmaa)
- 1996 Toxicology (Dr. Fossum) at University of Oslo
- 1996 Sampling of Pollutants in the Working Atmosphere (Statens Arbeidsmiljø Institutt (Norwegian Institute of Occupational Environmental Health))

Professional Memberships

- American Conference of Governmental Industrial Hygienists (ACGIH) full member since 2000
- ACGIH Biological Exposure Indices (BEI) committee member since 2013
- French Agency for Food, Environmental and Occupational Health & Safety (ANSES) Indicateurs biologiques d'exposition (IBE) committee member since 2014
- Swiss Occupational Hygienist Association (SSHT) member
- Certified Swiss Occupational Hygienist obtained in May 2015
- Society of Toxicology (SOT) full voting member since 2011
- Privat Docent (PD) at University of Lausanne (UNIL) in July 2015

C. Selected Peer-reviewed Publications

1. Gerster FM, **Hopf NB**, Wild PP, Vernez D. Airborne Exposures to Monoethanolamine, Glycol Ethers, and Benzyl Alcohol During Professional Cleaning: A Pilot Study. *Ann Occup Hyg.* 2014 May 6. [Epub ahead of print]
2. Brusweiler ED, **Hopf NB**, Wild P, Huynh CK, Fenech M, Thomas P, Hor M, Charriere N, Savova-Bianchi D, Danuser B. Workers exposed to wood dust have an increased micronucleus frequency in nasal and buccal cells – Results from a pilot study. *Mutagenesis* Accepted 2014
3. Gerster FM, Vernez D, Wild PP, **Hopf NB**. Hazardous substances in frequently use professional cleaning products. *Int J Occup Environ Health* 2014 20(1): 46-60. doi:10.1179/2049396713Y.0000000052
4. Miles A, Berthet A, **Hopf NB**, Gilliet M, Raffoul W, Vernez D, Spring P. A new alternative method for testing skin irritation using a human skin model: A pilot study. *Toxicol In Vitro.* 2014 Mar;28(2):240-7. doi: 10.1016/j.tiv.2013.10.022.

5. **Hopf NB**, Berthet A, Vernez D, Langard E, Spring P, Gaudin R. Skin permeation and metabolism of di(2-ethylhexyl) phthalate (DEHP). *Toxicol Lett.* 2014 Jan 3;224(1):47-53. doi: 10.1016/j.toxlet.2013.10.004.
6. Berthet A, **Hopf NB**, Miles A, Spring P, Charrière N, Garrigou A, Baldi I, Vernez D. Human skin in vitro permeation of bentazon and isoproturon formulations with or without protective clothing suit. *Arch Toxicol.* 2014 Jan;88(1):77-88. doi: 10.1007/s00204-013-1087-4.
7. Ruder AM, Hein MJ, **Hopf NB**, Waters MA. Mortality among 24,865 workers exposed to polychlorinated biphenyls (PCBs) in three electrical capacitor manufacturing plants: A ten-year update. *Int J Hyg Environ Health.* 2014 Mar;217(2-3):176-87. doi: 10.1016/j.ijheh.2013.04.006.
8. Lauby-Secretan B, Loomis D, Grosse Y, El Ghissassi F, Bouvard V, Benbrahim-Tallaa L, Guha N, Baan R, Mattock H, Straif K; International Agency for Research on Cancer Monograph **Working Group** IARC, Lyon, France. Carcinogenicity of polychlorinated biphenyls and polybrominated biphenyls. *Lancet Oncol.* 2013 Apr;14(4):287-8. doi: 10.1016/S1470-2045(13)70104-9.
9. **Hopf NB**, Ruder AM, Succop P, Waters MA. Evaluation of cumulative PCB exposure estimated by a job exposure matrix versus PCB serum concentrations. *Environ Sci Pollut Res Int.* 2013 Mar 10.
10. **Hopf NB**, Ruder AM, Waters MA. Historical reconstruction of polychlorinated biphenyl (PCB) exposures for workers in a capacitor manufacturing plant. *Environ Sci Pollut Res Int.* 2013 Mar 9. [Epub ahead of print]
11. **Hopf NB**, Ruder AM, Waters MA, Succop P. 2013. Concentration-dependent Half-Lives of Polychlorinated Biphenyl in Sera from an Occupational Cohort. *Chemosphere in Press.*
12. Bruschweiler ED, Danuser B, Cong KH, Wild P, Schupfer P, Vernez D, Boiteux P, **Hopf NB**. (2012) Generation of polycyclic aromatic hydrocarbons (PAH) during woodworking operations. *frontiers in Oncology* 2; 00148, DOI=10.3389/fonc.2012.00148
13. Gerster FM, **Hopf NB**, Huynh CK, Plateel G, Charriere N, Vernez D. 2012. A simple gas chromatography method for the analysis of monoethanolamine in air. *J. Sep. Sci.* 2012, 00, 1–7.
14. Talaska G and **Hopf NB**. Book chapter “2-naphthylamine” in *Encyclopedia of Toxicology*, 3rd Edition, 2012 *in press*
15. Eskes C, Detappe V, Koëter H, Kreysa J, Liebsch M, Zuang V, Amcoff P, Barroso J, Cotovio J, Guest R, Hermann M, Hoffmann S, Masson P, Alépée N, Arce LA, Brüschweiler B, Catone T, Cihak R, Clouzeau J, D'Abrosca F, Delveaux C, Derouette JP, Engelking O, Facchini D, Fröhlicher M, Hofmann M, **Hopf N**, Molinari J, Oberli A, Ott M, Peter R, Sá-Rocha VM, Schenk D, Tomicic C, Vanparys P, Verdon B, Wallenhorst T, Winkler GC, Depallens O. Regulatory assessment of in vitro skin corrosion and irritation data within the European framework: Workshop recommendations. *Regul Toxicol Pharmacol.* 2011 Nov 6. [Epub ahead of print]
16. Vernez, D.; Paccaud, C.; Berode, M.; **Hopf, N.**; Charrière, N.; Laubscher, B. Solvent vapours in incubators: a source of exposure among neonates? *Gefahrstoffe- Reinhaltung der Luft* 2011;5:209-214.
17. Hines CJ, **Hopf NB**, Deddens JA, Silva MJ, Calafat AM. Occupational exposure to diisononyl phthalate (DiNP) in polyvinyl chloride processing operations. *Int Arch Occup Environ Health.* 2011 Jun 24. [Epub ahead of print] PubMed PMID: 21701833.
18. **Hopf NB**, Kirkeleit J, Bråtveit M, Succop P, Talaska G, Moen B. Evaluation of exposure biomarkers in offshore workers exposed to low benzene and toluene concentrations. *Int Arch Occup Environ Health.* 2011 Jun 14. [Epub ahead of print].

19. Rocheleau CM, Bertke SJ, Deddens JA, Ruder AM, Lawson CC, Waters MA, **Hopf NB**, Riggs MA, Whelan EA. Maternal occupational exposure to polychlorinated biphenyls and the secondary sex ratio in an occupational cohort study. *Environ Health*. 2011;18;10:20.
20. Ward EM, Schulte PA, Straif K, **Hopf NB**, Caldwell JC, Carreón T, Demarini DM, Fowler BA, Goldstein BD, Hemminki K, Husgafvel Pursiainen K, Kuempel E, Lewtas J, Lunn RM, Lynge E, McElvenny DM, Muhle H, Nakajima T, Robertson LW; IARC Working Group. Research Recommendations for Selected IARC-Classified Agents. *Environ Health Perspect*. *Environ Health Perspect* 2010;118(10): doi:10.1289/ehp.0901828
21. **Hopf NB**, Waters MA, Ruder AM, Prince MM. Development of a Retrospective Job Exposure Matrix for PCB-exposed Workers in Capacitor Manufacturing. *J Occup Health*. 2010;52(4):199-208
22. Hines CJ, **Hopf NB**, Deddens JA, Silva MJ, Calafat AM. Estimated daily intake of phthalates in occupationally exposed groups. *J Expo Sci Environ Epidemiol*. [Epub ahead of print]
23. Hines CJ, Yau AY, Zuniga MM, Wells JR, Nilsen **Hopf NB**, Camann DE. Development of a personal dual-phase air sampling method for phthalate diesters. *J Environ Monit*. 2010 Feb;12(2):491-9. Epub 2009 Oct 28.
24. **Hopf NB**, Ruder AM, Succop P. Background levels of polychlorinated biphenyls in the U.S. population. *Sci Total Environ*. 2009 Dec 1;407(24):6109-19. Epub 2009 Sep 20. Review.
25. **Hopf NB**, Carreon T, Talaska G. Biological markers of carcinogenic exposure in the aluminum smelter industry--a systematic review. *J Occup Environ Hyg*. 2009 Sep;6(9):562-81. Review.
26. **Hopf NB**, Kirkeleit J, Kramer SL, Moen B, Succop P, Genter MB, Carreón T, Mack J, Talaska G. Urinary 1-hydroxypyrene levels in offshore workers. *Int Arch Occup Environ Health*. 2010 Jan;83(1):55-9. Epub 2009 Jun 9.
27. **Hopf NB**, Waters MA, Ruder AM. Cumulative exposure estimates for polychlorinated biphenyls using a job-exposure matrix. *Chemosphere*. 2009 Jun;76(2):185-93. Epub 2009 Apr 25.
28. Hines CJ, Nilsen **Hopf NB**, Deddens JA, Calafat AM, Silva MJ, Grote AA, Sammons DL. Urinary phthalate metabolite concentrations among workers in selected industries: a pilot biomonitoring study. *Ann Occup Hyg*. 2009 Jan;53(1):1-17. Epub 2008 Oct 23.
29. Silver SR, Whelan EA, Deddens JA, Steenland NK, **Hopf NB**, Waters MA, Ruder AM, Prince MM, Yong LC, Hein MJ, Ward EM. Occupational exposure to polychlorinated biphenyls and risk of breast cancer. *Environ Health Perspect*. 2009 Feb;117(2):276-82. Epub 2008 Sep 26.
30. Prince MM, Ruder AM, Hein MJ, Waters MA, Whelan EA, **Nilsen N**, Ward EM, Schnorr TM, Laber PA, Davis-King KE. Mortality and exposure response among 14,458 electrical capacitor manufacturing workers exposed to polychlorinated biphenyls (PCBs). *Environ Health Perspect*. 2006 Oct;114(10):1508-14.
31. Ruder AM, Hein MJ, **Nilsen N**, Waters MA, Laber P, Davis-King K, Prince MM, Whelan E. Mortality among workers exposed to polychlorinated biphenyls (PCBs) in an electrical capacitor manufacturing plant in Indiana: an update. *Environ Health Perspect*. 2006 Jan;114(1):18-23.
32. Steenland K, Hein MJ, Cassinelli RT 2nd, Prince MM, **Nilsen NB**, Whelan EA, Waters MA, Ruder AM, Schnorr TM. Polychlorinated biphenyls and neurodegenerative disease mortality in an occupational cohort. *Epidemiology*. 2006 Jan;17(1):8-13.

D. Research Support

Ongoing Research Support

OFSP Skin exposure to bisphenol A (BPA) and its substitutes Hopf (PI) May 2015-September 2018
Dermal uptake: Assessing skin permeation and metabolism of BPA and its substitutes. The goal of this project is to assess toxicokinetics for the dermal route and develop biological indicators for BPA.

Collaboration Thailand and IST: Exposures to nanoparticles in cement Hopf (PI) June 2015-June 2018
Assess inhalation exposures to nanoparticles in cement among construction workers. Goal is to characterize exposures to nanoparticles in this sector and to compare exposure between workers exposed to nano-cement and regular cement.

OFSP Co-exposures to glycol ethers and ethanol amines Hopf (PI) March 2013-September 2015
Dermal uptake: Assessing skin permeation and metabolism of mixed glycol ether exposures and separately for ethanolamines. Inhalation exposure: Elimination kinetics in volunteers exposed to a mixture of glycol ethers in a controlled experiment to determine the best time to sample urine and then validating the timing of urine sampling among professional cleaners using product.

ANSES Co-exposures to asphalt (bitumen) and UV Hopf (PI) September 2012-March 2013
Evaluation de la contribution cutanée à l'exposition aux produits HAP et UV. The goal of this project is to determine the skin permeation of PAHs with UV exposures, and measure possible skin damage (MMP1, P53, sunburnt cells)

Swiss Centre for Applied Human Toxicology (SCAHT) Hopf (PI) January 2011-March 2012
Dermal uptake: Assessing skin retention and metabolism
The goal of this project is to assess toxicokinetics for the dermal route and develop biological indicators for DEHP.

Federal Office of Public Health (Switzerland) Berthet (PI) April 2011-April 2012
Evaluation de la contribution cutanée à l'exposition aux produits biocides
The goal of this study is to assess skin exposure to two biocides widely used in Switzerland and to determine their permeation rate through human skin in using an *in vitro* system.
Role: Co-Investigator

EST-2010/2/026 (ANSES, France) Vernez (PI) April 2011-April 2012
SkiPPER - Skin and Protection clothing Permeation
The goal of this study is to determine the permeation rate of human skin for two herbicides and to assess the efficiency of recommended protective clothing to these both pesticides using an *in vitro* system.
Role: Co-Investigator

Federal Office of Public Health (Switzerland) Vernez (PI) June 2010- June 2013
Exposure assessment of asthmatoxins among professional cleaners
Quantify air concentrations of several irritants found in cleaning products used by professional cleaning companies. Minimum 10 workplaces and more than 100 concentration measurements will be made.
Role: Co-Investigator

Federal Office of Public Health (Switzerland) Hopf (PI) January 2010-January 2012
Toxicokinetic differences between aging (>58 years) and young (<25 years) exposed to PGME in an exposure chamber for 6 hours at half the Swiss occupational exposure value (50 ppm)