



## Highly Fluorinated Compounds – Social and Scientific Discovery

# WELCOME TO THE CONFERENCE

## Phil Brown



**Northeastern University**  
*Social Science Environmental Health  
Research Institute*

Funding: NIEHS (R13ES028097-01, 1R01ES017514 - 01A1 R25 GM109447-01, T32 ES023769-01, P42 ES017198-04) NSF (SES-1456897)

# Thanks to our conference funders and partners



National Institute of Environmental Health Sciences  
*Your Environment. Your Health.*



Northeastern University  
*Humanities Center*



SILENT SPRING INSTITUTE  
Researching the Environment and Women's Health



TESTING *for* PEASE

# Thanks to Organizing Committee

- Andrea Amico, Testing for Pease
- Elizabeth Boxer, Northeastern
- Sylvia Broude, Toxics Action Center
- Phil Brown, Northeastern
- Courtney Carignan, Harvard
- Alissa Cordner, Whitman College
- Michelle Dalton, Testing for Pease
- Alayna Davis, Testing for Pease
- Sokona Diallo, Northeastern
- Shaina Kasper, Toxics Action Center
- Stephanie Knutson, Northeastern
- Lauren Richter, Northeastern
- Laurel Schaider, Silent Spring Institute



# Special greetings to the representatives from affected communities

- While everyone here has a part to play, residents of affected communities:
  - Face the hazards every day
  - Have identified their problems and taken remarkable levels of action
  - And have given strength and inspiration to each other and to the rest of the parties in this room



# Special thanks to Dr. Linda Birnbaum, our keynote speaker

- As Director of the National Institute of Environmental Health Sciences (NIEHS) and the National Toxicology Program, she brings remarkable experience, credibility, and leadership to research and research translation

**science**

- This is what democracy looks like  
Λ



Special call-out to our courageous friends at EPA who are doing their work in the midst of attacks on them by their own Administrator



EPA Staff Demonstration in Boston May 24, 2017



**Northeastern University**  
*Social Science Environmental Health  
Research Institute*

- Faculty, postdocs, grad students, undergrads working on many projects with multiple partners
- The only specialized setting for social science-environmental health collaborations, including past NSF and current NIEHS T32 Training Programs
- SSEHRI and predecessor Contested Illnesses Research Groups at Brown have 30 years of involvement with Toxics Action Center and 14 years of funded collaboration with Silent Spring Institute

**<http://www.northeastern.edu/environmentalhealth/>**



# SSEHRI's PFAS Lab

- Study contamination sites
  - In-depth Interviews (71), media analysis, and ethnographic observation
- Study history of PFAS, including discovery of health effects, litigation, community awareness
  - Multi-sited observation of regulatory agencies and research laboratories, scientific literature review, regulatory document analysis
- Website with up-to-date media coverage ([pfasproject.com](http://pfasproject.com))
  - Contamination Site Tracker
- Help build nationwide coalition of people and groups
- Help affected community groups link up with each other and obtain resources
- Collaborate on research proposal with Silent Spring Institute, Harvard School of Public Health, Testing for Pease, Toxics Action Center, Mass. Breast Cancer Coalition, GreenCAPE, and Sierra Club

# PFAS Lab Team

**Phil Brown – PI – Northeastern**

**Alissa Cordner – Co-PI – Whitman  
College**

## *Postdocs*

- Vanessa De La Rosa –  
Northeastern/Silent Spring Institute
- Jennifer Ohayon – Northeastern/Silent  
Spring Institute

## *Graduate Students*

- Lauren Richter – Northeastern
- Elicia Cousins – Northeastern
- Tibrine De Fonseca – Northeastern
- Marina Atlas – Northeastern

## *Undergraduates*

- Yvette Niwa – Northeastern
- Chelsea Canedy – Northeastern
- Elizabeth Boxer – Northeastern
- Sokona Diallo – Northeastern
- Nick Chaves – Northeastern
- Clare Malone – Northeastern
- Walker Bruhn – Whitman College

## *Collaborators*

- Laurel Schaider – Silent Spring  
Institute
- Ruthann Rudel – Silent Spring  
Institute
- Arlene Blum – Green Science Policy  
Institute
- Bill Walker – Environmental  
Working Group

# Website: <https://pfasproject.com>



Northeastern University  
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## PER- AND POLYFLUOROALKYL SUBSTANCES

*The Social Discovery of a Class of Emerging Contaminants*

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CONTAMINATION SITES ▾

ADDITIONAL RESOURCES



### NEWS

DuPont has spent more on attorneys than testing people for contamination, critics say

April 20, 2017 — 0 Comments



### NEWS

Firms combine PFC suits, seek



New York Expands Drinking Water Protections for Millions

### NEWS

New York Expands Drinking Water Protections for Millions

April 14, 2017 — 0 Comments



### TOXIC WATERS

Illegal dumping efforts to evade farmer's livelihood, and lax regulations for all companies result in water contamination.



### RELATED

TOXIC WATERS  
MONEY FLOWS

### UPCOMING CONFERENCE

Save the Date: June 14 – 15, 2017 Highly  
Polarized Compounds – Social and  
Scientific Discovery at Northeastern  
University, Boston

### RECENT POSTS

DuPont has spent more on attorneys than  
testing people for contamination,  
critics say

April 20, 2017

New York Expands Drinking Water  
Protections for Millions

April 14, 2017

Firms combine PFC suits, seek money,  
tests for residents of Bucks, Montgomery  
counties Pennsylvania

March 27, 2017

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# Contamination Site Tracker

- Media Coverage
  - Date of Discoveries
  - PFAS Levels Detected
  - Source(s) of Contamination
  - Regulatory Responses
  - Community Concerns
  - Biomonitoring
  - Litigation
  - Demographics
- 
- We're especially grateful to Nick Chaves, Yvette Niwa, and Elizabeth Boxer at SSEHRI for creating the database, and to Bill Walker and Soren Rundquist at EWG for producing the interactive map

# Contamination Site Database

B	C	D	E	F	G	H	I	J	K	L	M	
Date of Discovery	Source of Discovery	Contaminant Level and details	Contamination Level (ppt)	Treatment	Alternate Water supply	Local, State, Federal, Regional Government (4 separate columns)	Activity at Site	Litigation	Biomonitoring/ Blood Testing	Reported/ Suspected Health Effects	Media Attention	Comm Chara
Report published 5/19/ 2016.	NH DES well water testing of 11 wells showed high levels of PFOA.	PFOA ranging from non-detect to 620ppt, 4 of the 11 well test results were more than 100ppt	PFOA non-detectable - 620ppt, 4 wells >100ppt	N/A	Residents w/ wells > than 100ppt advised not to drink the water. Bottled water deliveries to homes with private wells within half-mile radius of the former site	(Local) Expected to be a much smaller scale contamination than Merrimack or Litchfield (5/18/16)	Water was tested at former site of Textiles Coated International (TCI).	N/A	N/A	N/A	Continued	Small t people.
About a year ago (2015).	Air Force discovers 1,4 dioxane and starts testing all private wells.	78,000-1,800,000ppt in Johns Pond and Ashument Pond (7/20/16).	78,000-1,800,000ppt	N/A	9 homes receiving bottled water after finding levels exceeding Federal EPA advisory levels (7/20/16).	(Federal) Air Force conducting testing	Air Force dumped waste water into a trench.	N/A	N/A	N/A	Recent, another site regarding military contamination.	Base o 22,000 Surround of Faln Bourne
*FCs found in drinking water from base wells 01/2016).	52 private off-base samples collected 02/3/16 - 02/13/16	Two wells near Fentress have levels above Federal EPA's PHA.		N/A	Navy will provide bottled water for the two homeowners with high levels of PFCs.	(Local) Director of Chesapeake Health Department told community not to panic.	Naval Auxiliary Landing Field Fentress in the area.	N/A	N/A	N/A	Another site regarding military contamination.	Third n populor Virgini 232,97
*FOA found in groundwater near Vermont Air National Guard base, Pittsford Fire Academy, and IBM and Champlain cable plants 7/13/16).	Water samples taken near National Guard base and Fire Academy. Part of statewide testing (6/9/16). DEC testing near industrial facilities (7/14/16).	National Guard base- 9,300ppt (PFOA), 38,000ppt (PFOS); Fire Academy- 72ppt(PFOS), 6ppt (PFOA) (6/9/16); Essex Junction IBM- 8-190ppt.	National Guard base: 9,300ppt (PFOA) and 38,000ppt (PFOS).	State to ask IBM and Champlain Cable to fund clean up costs (7/14/16).	N/A	(State) Governor Shumlin initiates statewide testing (6/9/16).	Fire fighting foams at base and Fire Academy. IBM pipe transporting chemicals leaked (7/14/16).	N/A	N/A	N/A	Local news coverage. Large media attention for Vermont as a whole	Vermont populor with 15 people.



**New Collaboration: Environmental Working Group has put our database into a searchable online map –just launched and here for you to use – our database plus EPA UCMR3 data**  
<http://www.ewg.org/research/mapping-contamination-crisis>





Know your environment.  
Protect your health.

Search  GO



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# MAPPING A CONTAMINATION CRISIS

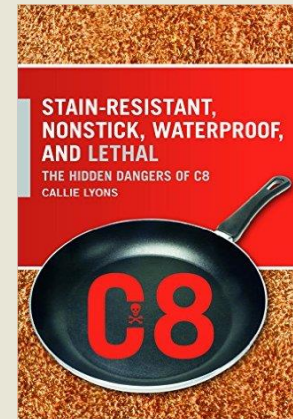
*PFCs Pollute Tap Water for 15  
Million People, Dozens of  
Industrial Sites*





# Multisectoral Alliance Potential

- Affected communities
- Academic and regulatory scientists
- Scientist-advocates
- Active military and veterans
- Environmental and health social movement organizations
- Water utilities
- State and federal legislators and regulators
- Federal funding institutions
- Supply chain manufacturers
- Lawyers
- Journalists



## These Chemicals in Pizza Boxes and Carpeting Last Forever

More than 200 scientists around the world document the threats of perfluorinated compounds and call for more government control.

By Lindsey Konkel, National Geographic  
Published first online on 10/26/2011



**NATIONAL GEOGRAPHIC**



# **WHAT DID INDUSTRY KNOW? DECADES OF INTERNAL STUDIES BY DUPONT AND 3M**

# Environmental Working Group Timeline

<b>1961</b>	A DuPont toxicologist warns that Teflon chemicals cause liver enlargement in rats and rabbits.
<b>1962</b>	DuPont scientists have 40 volunteers smoke cigarettes laced with Teflon. Ninety percent of the most highly exposed group develop flu-like symptoms known as polymer fume fever.
<b>1973</b>	DuPont finds there is no safe level of exposure to C8/PFOA in animals.
<b>1976</b>	3M begins testing some workers' blood for PFOA and finds it in almost every one tested.
<b>1978</b>	3M finds that PFOA is "completely resistant" to breakdown in the environment.
<b>1979</b>	3M finds PFOS in the blood of five workers in Alabama. Fish in the Tennessee River, where up to 1 million pounds of PFOS waste were dumped each year, are found to have significant concentrations of the chemical in their blood, evidence of bioaccumulation.
<b>1981</b>	3M finds that PFOA causes birth defects in rats.
<b>1981</b>	DuPont finds PFOA in umbilical cord blood from one baby and blood from a second baby born to female workers at the Washington Works plant.
<b>1981</b>	Two of seven children of women working at Washington Works are found to have birth defects of the eye, tear duct or nose. DuPont transfers "all potentially exposed female employees" out of the plant but does not tell them why.
<b>1983</b>	3M doctors warn that organic fluorine levels in workers' blood are steadily rising, evidence that PFCs accumulate faster than the body can eliminate them.
<b>1984</b>	DuPont finds PFOA in tap water in two mid-Ohio Valley communities. Tests continue for 17 years before DuPont informs any area water suppliers.
<b>1992</b>	Data on workers at DuPont's Washington Works plant reveal an excess of deaths from cancer and leukemia.
<b>1993</b>	A 3M study of employees at a PFOA plant finds twice as many deaths from prostate cancer as in the general population.
<b>1997</b>	3M looks worldwide for clean blood samples to compare to its workers' blood but finds only one source not contaminated with PFOS – preserved blood of soldiers who died in the Korean War, before Scotchgard products spread worldwide.
<b>1998</b>	3M finds that PFOS causes liver cancer in rats. Despite federal law prohibiting the use in food of any substance that causes cancer in animals, 3M continued until 2000 to petition the FDA to allow PFOS in microwave popcorn bags.
<b>1999</b>	3M study in six East Coast cities finds PFCs in supermarket food, rivers and lakes, drinking water sources and tap water.

# **1981: The problem rises to the surface, but...**

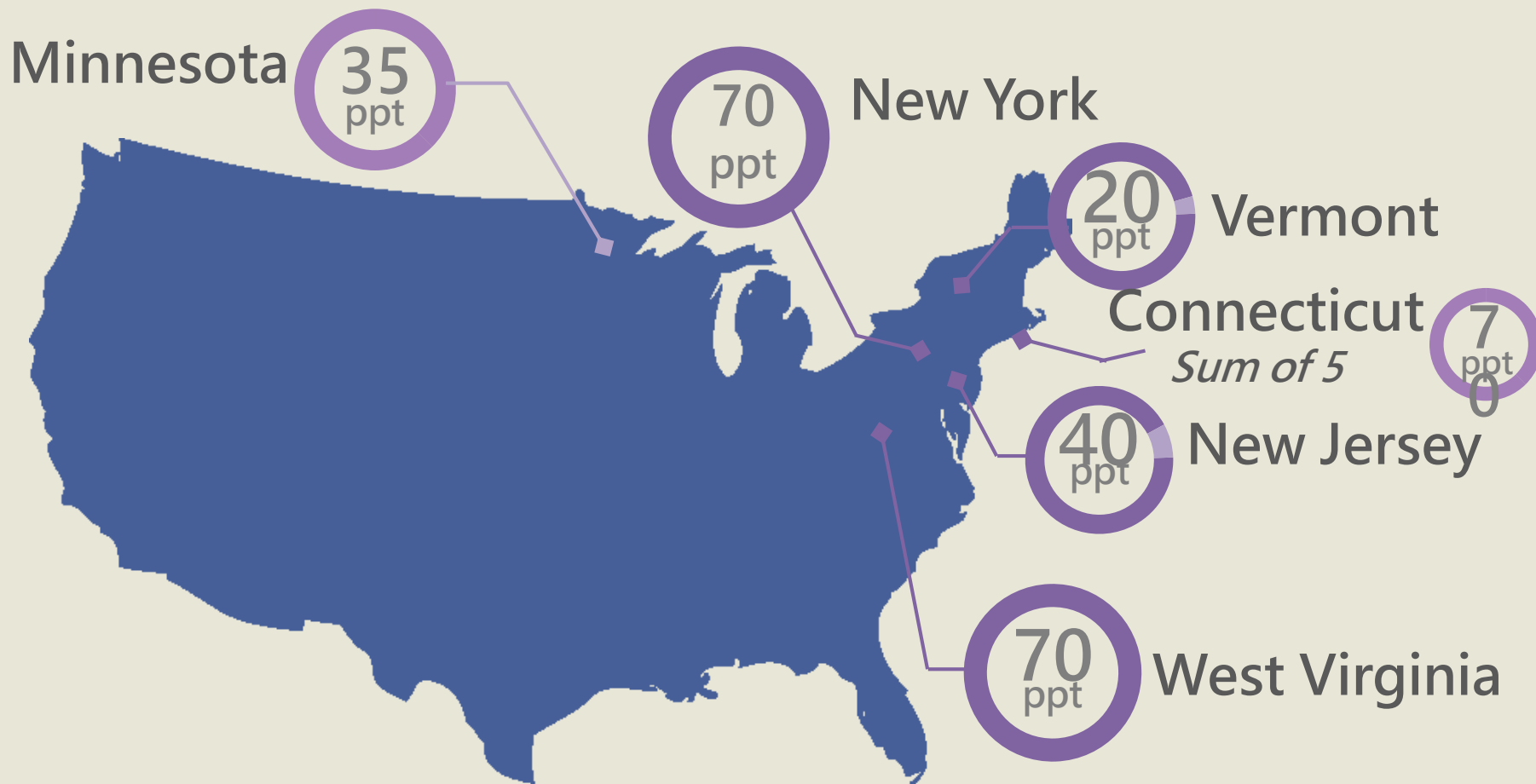
## **Why did two decades pass since 1961 animal health effects research and 1962 human health effects research?**

- 1981, 3M provided DuPont and the EPA the results of an internal laboratory study finding that pregnant rats exposed to PFOA experienced birth defects in pups
- Documents later obtained in litigation indicate that DuPont began closely monitoring the health of female staff in the Teflon division of the Washington Works Plant due to 3M's 1981 research.
- 1981 - female DuPont employee in the Teflon division, Sue Bailey, gave birth to a baby with severe birth defects. (2 out of 7 births)
- A colleague put Sue Bailey in touch with another worker in the Teflon division whose baby born with eye deformities.
- 1981 - DuPont removed all female staff from the Teflon unit, notified employees to speak with medical staff prior to getting pregnant

# Some Recent Successes

# State-Level Drinking Water Guidelines – PFOA

- PFOA alone has been detected in 94 public water systems in 27 states



**New Jersey considering 14 ppt maximum contaminant level, Minnesota change from 300 ppt May 2017 (35 ppt PFOA, 27 ppt PFOS), Connecticut-sum of PFOS, PFOA, PFHxS, PFNA, PFHpA**





# FDA de-lists three types of food packaging containing PFAS Dec. 29, 2015

- But these uses are already discontinued
- Regulation after-the-fact
- Whack-a-mole
- **Organizing potential:** unique petition to *de-list* compounds — done by petition from NRDC, with eight co-signing organizations
- **Regulatory Precedent:** Applying toxicological concerns about PFOA to the entire class of long-chain PFASs
- **Regulatory Precedent:** FDA decision based on a *safety standard*, not *market abandonment*

## Can Chemical Class Approaches Replace Chemical-by-Chemical Strategies? Lessons from Recent U.S. FDA Regulatory Action on Per-And Polyfluoroalkyl Substances

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Lauren Richter

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Phil Brown

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**ABSTRACT:** Concern about the toxicity and exposure of per- and polyfluoroalkyl substances (PFASs) is growing among scientists, regulators, and residents of contaminated communities. In 2016, the United States Food and Drug Administration (FDA) removed three food contact substances (FCSs) containing perfluorinated chemicals from the list of approved FCSs due to concerns regarding chemical safety. To investigate the significance and limitations of the FDA's regulatory action for environmental health research, advocacy, and regulation, we conducted a media analysis and qualitative interviews with a range of involved stakeholders. We find that the FDA's regulatory action represents a potential shift from chemical-by-chemical regulation toward class-based regulation, where groups of chemicals can be identified as sharing properties and risks, and are thus evaluated and regulated together. The FDA decision sets an important precedent of using a petition process to delist chemicals based on a safety standard. However, the narrow reach of this action also highlights the need for more comprehensive, precautionary chemical regulation capable of thoroughly evaluating classes of chemicals, and raises important questions about how classes of chemicals are delimited in environmental health science and regulation.



# Potential for Consumer Action

- Success already in limiting PFASs in products, similar to flame retardant consumer activism
- We know that ultimately we can't “shop our way to safety” (Andrew Szasz) but we can **“organize our way to safety”?**

# *One last thing:* Redefining the idea of “emerging contaminants”

- “Legacy contaminants” – DDT, other pesticides, PCBs, dioxins and furans, benzene
- “Emerging contaminants” – Flame retardants, PFAS (highly-fluorinated compounds), BPA, parabens, phthalates
- This is not a useful dichotomy – we know about PFAS health effects since 1961, exactly when Rachel Carson wrote *Silent Spring*!!!

# Those contaminants have already “emerged”

- Many years of research already – well-established
- No longer difficult to get funded and published
- Extensive knowledge of ecological, animal, and human effects

# Video

- For many people who can't be here we are recording video of the presentations. This will only include close-ups of presenters, and no crowd shots. If you do not want to be recorded and have NOT already told us this, please let us know right away.

# Feedback Form

- Please fill out on-line form sent to all registrants to help us evaluate the conference.
- You'll note that it also contains a question about interest in future gatherings.



# Nuts and Bolts

- Bathrooms - right outside in the lobby across from registration table
- Food - along wall next to registration table
  - Please note on day 1 lunch, let the community groups members get in line first so they have time to get to their special location for working lunch
- Dinner – on your own – Lauren Richter will walk people over to Eatery (upscale food court) nearby in Prudential Center. If people want to gather particular clusters, let us know at the desk.



*Indication of harm,*

*not proof of harm, is our call to action.*

**ENJOY THE CONFERENCE**