

Welcome to Excellent Dirt






We will begin soon...

9/2/2020
PQCWebinar with Tanner Volek of the Cleaning Research Group

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Excellent Dirt

Featuring Tanner Volek of the Cleaning Research Group






Ask your questions using
the **Q&A** button



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product quality
cleaning workshops

The PQCW offers practical,
hands-on and independent,
training in cleaning.

More Info
shsu.edu/pqcw
pqcw@shsu.edu

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Darren Williams
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Tanner Volek
Cleaning Research
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Webinar Hosts

The PQCW Team




Barbara and Ed Kanegsberg - "The Cleaning Lady and the Rocket Scientist"

- BFK Solutions - Consultants in Critical Cleaning
- Authors and Editors of the two-volume CRC Handbook for Critical Cleaning
- Independent evaluations and recommendations
- Co-chairs of the Product Quality Cleaning Workshops
- barbara@bfksolutions.com and ed@bfksolutions.com



Darren Williams - "The Professor"

- Professor of Physical Chemistry at Sam Houston State University
- Leader of the Cleaning Research Group
- Co-chair of the Product Quality Cleaning Workshops
- Performs cleaning trials and formulates cleaning chemistries
- williams@shsu.edu



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Product Quality Cleaning Workshops

- ▶ Workshops
- ▶ Webinars
- ▶ Resources for more effective cleaning processes
- ▶ More information
 - ▶ shsu.edu/pqcw
 - ▶ bfksolutions.com/manufacturing-minds-pqcw/

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Our Speaker

Tanner Volek of the Cleaning Research Group

- Senior Chemistry Major
- **Graduating in December 2020**
- 2 Years experience as Physical Chemistry Lab Teaching Assistant
 - Includes experience in FTIR, Raman, Visible Spectroscopy
 - INCREDIBLE skills in Excel data analysis
 - Computational chemistry modeling
- 2 Years experience in the Cleaning Research Group
 - Hansen Solubility Parameter analysis of films, greases, and polymers
 - Solvent blend modeling and blend formulation using HSPs
 - Design of a vacuum cycle cavitation cleaning chamber
 - Design and formulation of a natural rubber hydrocarbon soil
 - Vapor degreasing and ultrasonic cleaning experience
- tanner.volek@gmail.com

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“The fastest way – sometimes the only way – to show if cleaning is effective”

Tanner Volek

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Goals of the Cleaning Research Group

-  Create hands-on cleaning demonstrations for the Product Quality Cleaning Workshop
-  Evaluate cleaning methods for removing difficult soils relevant to industry
-  Develop standard soils for testing the efficacy of cleaning processes
-  Develop solvent blends and aqueous formulations for cleaning difficult soils

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What is a standard soil?

- Soils are **undesired substances** that “soil” or “dirty” a surface, part, etc.
- Standard soils
 - *Consistent*
 - *Defined*
 - *Mimics residue*



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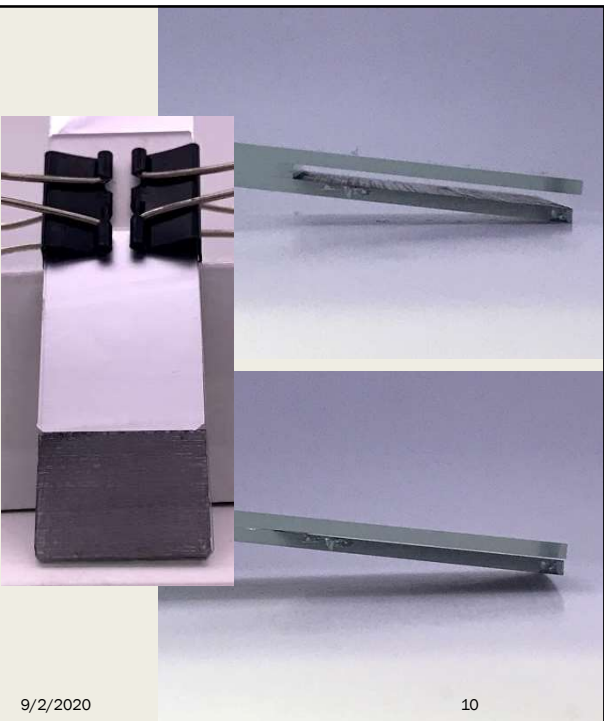
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Why create a standard soil?

- **Evaluating** cleaning processes to show if cleaning is effective
- **Comparing** different cleaning processes, techniques, equipment, etc.
- **Learning** about the cleaning taking place




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Good Examples



Bad Examples

What makes a good standard soil?



- available and easy to replicate
- easy to detect
 - (i.e. *black or fluorescent pink*)
- difficult to remove (not too difficult)
- easy to apply to a surface, part, etc.
- **representative of commonly encountered residues**

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Industrially-relevant Soils

- Apiezon hydrocarbon grease
 - Naturally fluorescent
- Graphite Rod
 - *Sooty black particles*
- Dust Sebum Emulsion
 - *Commercially available*
 - *Fingerprint and dust mimic*
- Permanent ink markers
 - *Alcohol or solvent carriers*
 - *Dark and opaque*
 - *Polymer binder*
- Natural rubber
 - *Sticky polymer*
 - *Easy to adjust the color, opacity (carbon black), and fluorescence (fingerprint powder)*

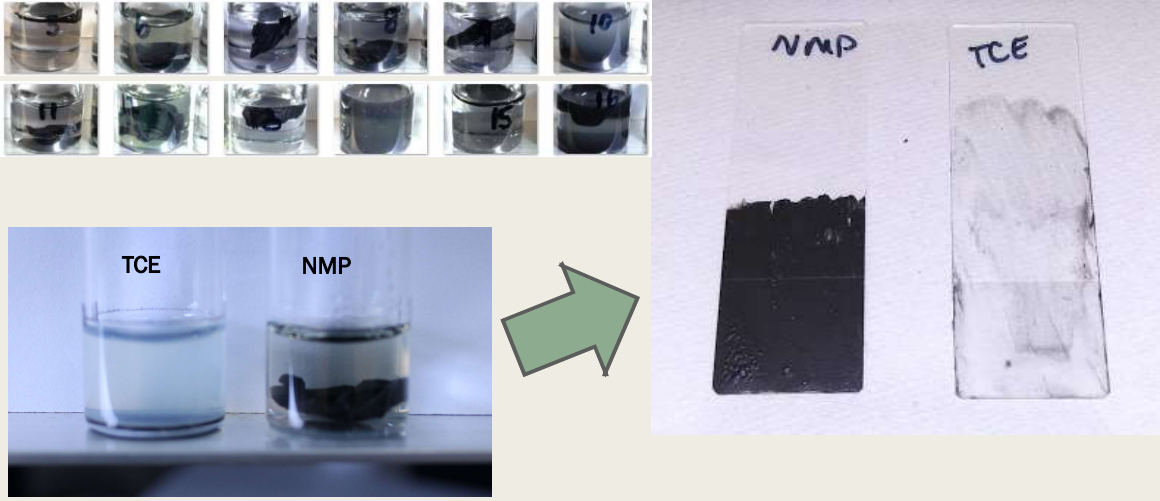


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Characterizing Natural Rubber Soil

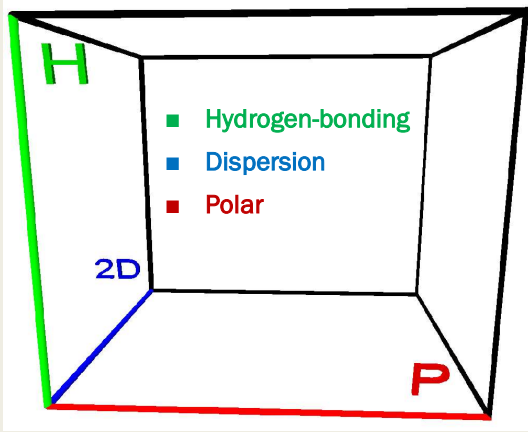
Expose natural rubber to 20 different solvents (12 are shown)



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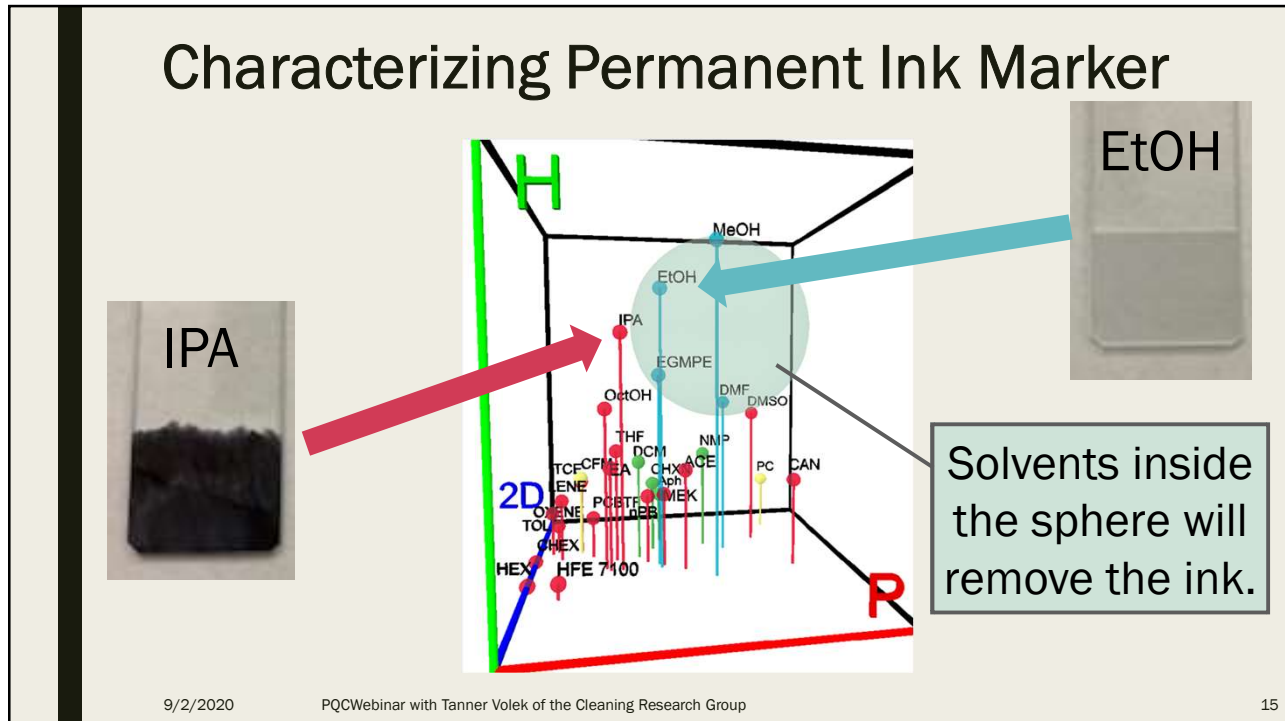
HSP and solvent-soil interactions



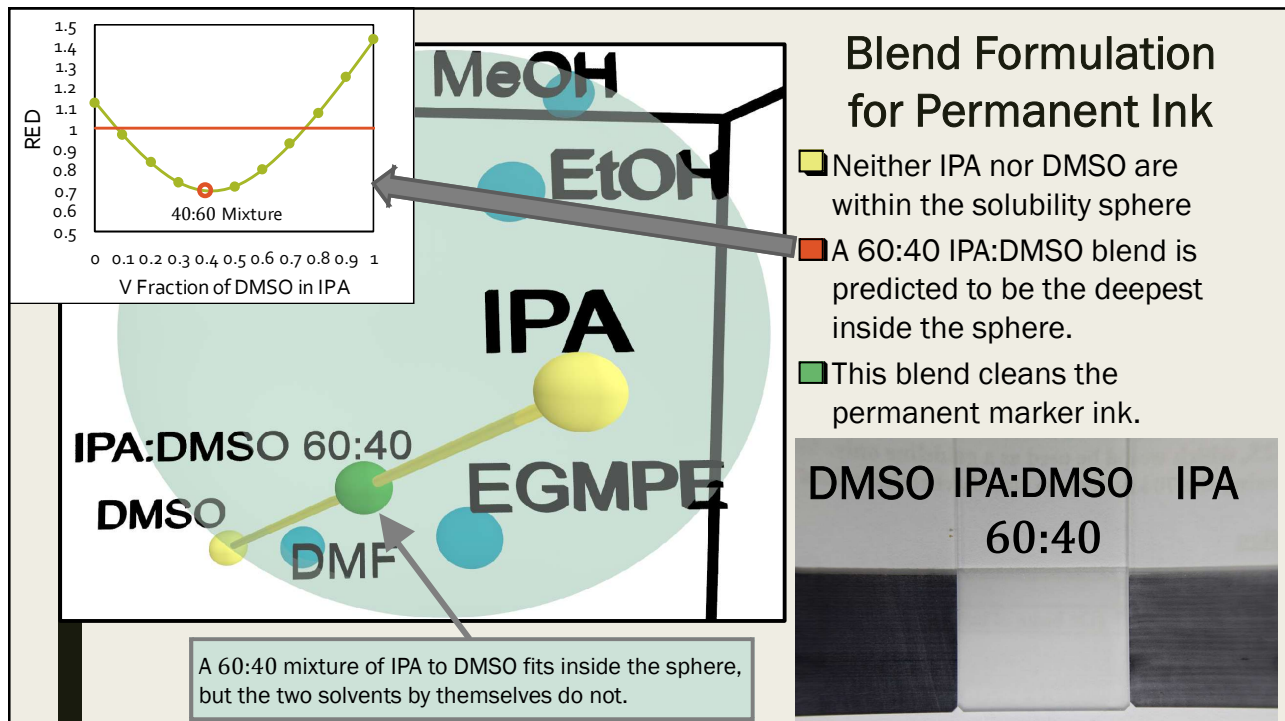
- Solvent compatibility
- Solvent blends
- Solvent substitutions

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Cleaning Natural Rubber Soil

Aqueous Ultrasonic Cleaning

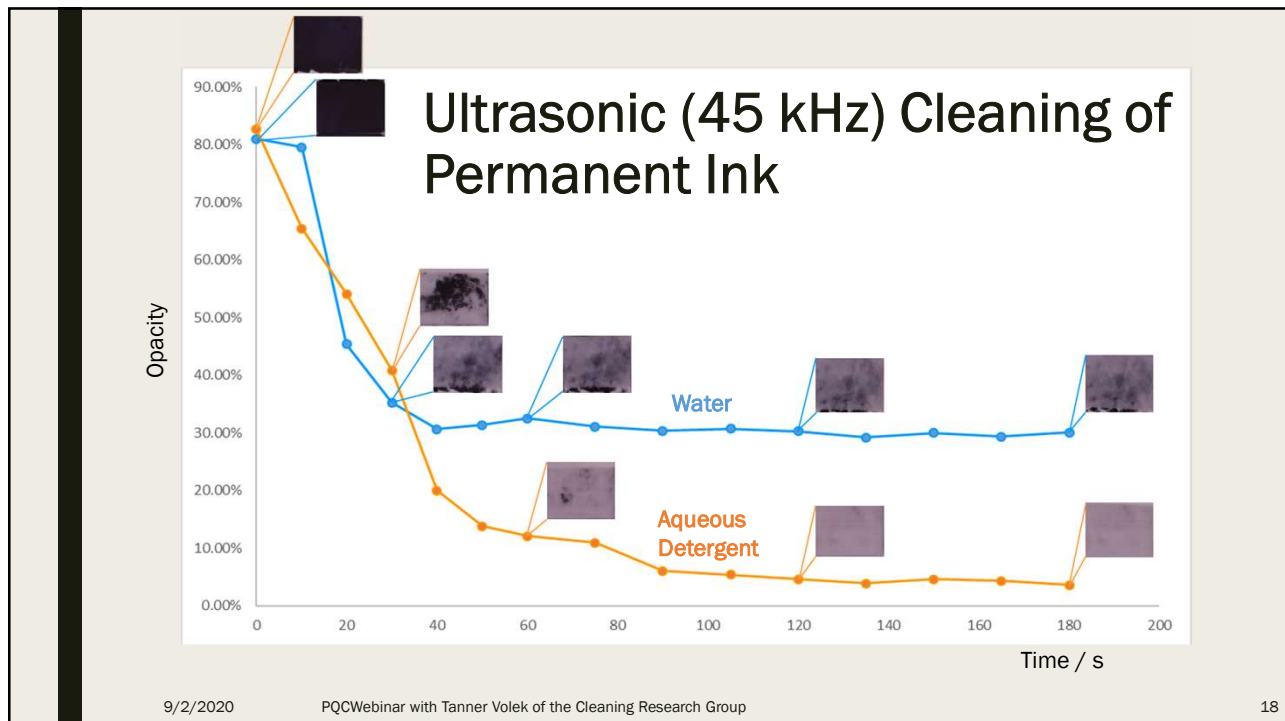


Vapor Degreasing



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Product Quality Cleaning Workshops

COME TO THE PQCW

- ▶ **When?** To Be Announced
- ▶ **Where?** Sam Houston
St. Univ., Huntsville TX
- ▶ **More Info?** Visit
<http://shsu.edu/pqcw>

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