UMassAmherst
The Commonwealth's Flagship Campus

Person-Directed Team-Based Process for Nurse-Led Invention

Development of 3 Novel Technologies to Support Cancer Survivors

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Disclosures

- No Conflicts of Interest

- Funding
  - NIH P20 UMANAGE Center Pilot Grant (P20 NR16599)
  - Susan G. Komen Foundation Career Catalyst Research Scholar Grant
  - Oncology Nursing Foundation/Sigma Nursing RE1 Research Grant
  - Rays of Hope Breast Cancer Foundation
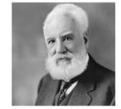 - AAAS-Lemelson Invention Ambassadors Program

Learning Objectives

Attendees will be able to:

- **Reflect on their own identity & responsibilities** as inventors who are part of a long history of nurse leaders inventing for health equity

- **Describe** elements and case examples of a person-directed, team-based approach to nurse-led invention

- **Commit to** integrating principles of equity-centered community design into invention and innovation for health & health care as a whole

DAME CICELY SAUNDERS

BESSIE BLOUNT GRIFFIN

April 24, 1951   B. V. GRIFFIN   2,550,554

PORTABLE RECEPTACLE SUPPORT

Filed March 29, 1948

Fig.1.   Fig.2.   Fig.3.   Fig.4.   Fig.5.   Fig.6.

Bessie Virginia Griffin
INVENTOR.

LUPE HERNANDEZ

ELAINE LARSON

DIGNITY

CAPABILITY

JUSTICE

TECHNOLOGISTS

COMMUNITY

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NURSE INVENTOR
Translation
Assessment
Creative Co-Design
Team Science
Health *beyond* Biomed

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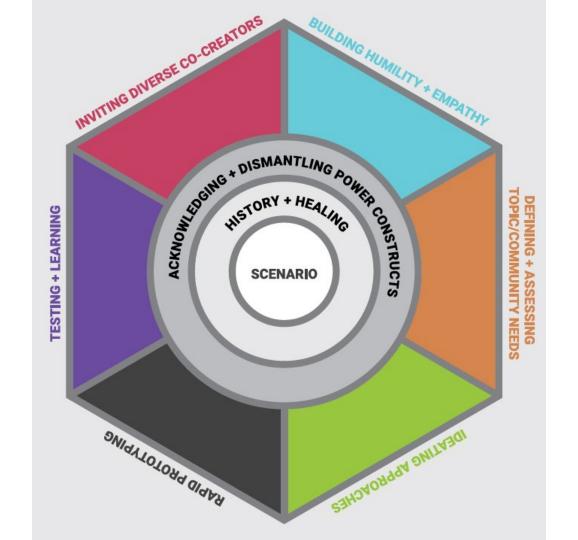
EQUITY-CENTERED COMMUNITY DESIGN

FIELD GUIDE

Addison Mayberry, PhD
Computer Science

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Measurement of Saccade Parameters

Error rate

Rate of failure to produce a saccade in the correct direction

Saccade latency

Time from stimulus jump to corresponding saccade onset

Positional error

Differences between eye direction (gaze) and the displayed target, recorded in pixels and converted to degrees

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Prosaccade Parameters by Fatigue Status

Saccade		Fatigued (VSS<=45)					Not Fatigued (VSS>45)				p
PRO		n	mean	SE	SD	CI	n	mean	SE	SD	CI	
Pr_delay	Latency (ms)	10	635.63	77.82	246.07	459.60 - 811.66	19	775.38	25.70	112.03	721.38 - 829.38	0.04*
Pr_diff	Position al Error (pixels)	10	2.33	0.51	1.62	1.17 - 3.48	19	2.54	0.37	1.59	1.78 - 3.31	0.70
Pr_w_diff	Position al Error (weight ed for time)	10	0.82	0.24	0.75	0.28	19	0.93	0.13	0.55	0.66 - 1.20	0.64

Sarah Perry, PhD
Chemical Engineering
Perry Group

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CHEM-ENG 590E Microfluidics and Analysis

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Point of Care System for Detection of Doxorubicin and its Metabolites using Hydrophobicity and Fluorescence

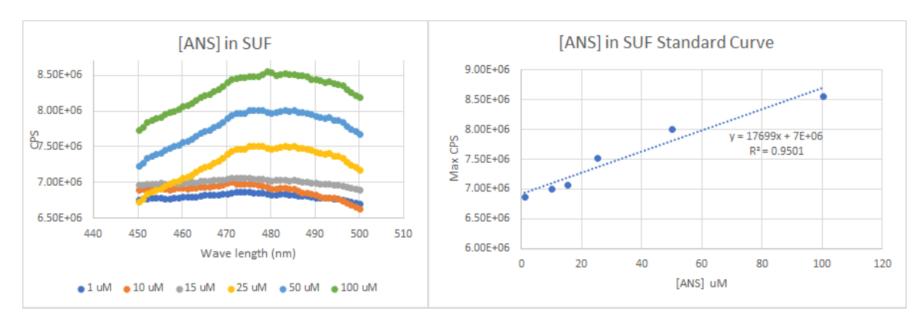Louis Colaruotolo,[a] Kylee Klinkowski,[b] Andrew Maloney,[b] and Rachel Walker[c]

It has become increasingly common for chemotherapy patients to be able to take their medication at home or through outpatient services. This has created the potential for toxicity to those who share spaces with and/or interact with patient bodily fluids, as hazardous active chemotherapeutic metabolites may be secreted in the bodily fluids of the patient. The current detection methods for these hazardous products are neither fast nor user-friendly, and thus are ineffective at closely monitoring the levels of these compounds in real-time. This device seeks to detect the level of doxorubicin and some of its toxic metabolites through the use of fluorescence detection and the hydrophobic properties of the drug and its metabolites. The device employs grayscale wax printed filter paper to purify the input urine's doxorubicin concentration such that it can be detected using fluorescence. Through experimentation with model urine and a model probe (ANS), the limit of detection for the proposed device was found to be 7.5 ppm. This study serves as groundwork for the creation of a point-of-care system for detecting fluorescent chemotherapeutic metabolites in bodily fluids.

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Figure 1. Prototype point-of-care devices for the detection of chemotherapeutics in urine. Two different versions of the printed wax test strip at 25% grayscale (top) and 50% grayscale (bottom) can be observed, surrounded by a dark black border to limit sample loss from the test strip.

Courtesy of Dr. Sarah Perry, Chemical Engineering UMASS Amherst

Figure 3. The emission spectra of ANS dissolved in simulated urine (SUF) (left). Concentrations of ANS were again varied from 0 to 100 μM. A standard curve was then generated to determine the relationship between ANS concentration and maximum counts per second (CPS) of the fluorescent probe at 480 nm (right). From this data, the limit of detection of ANS in SUF was determined to be 25 μM.
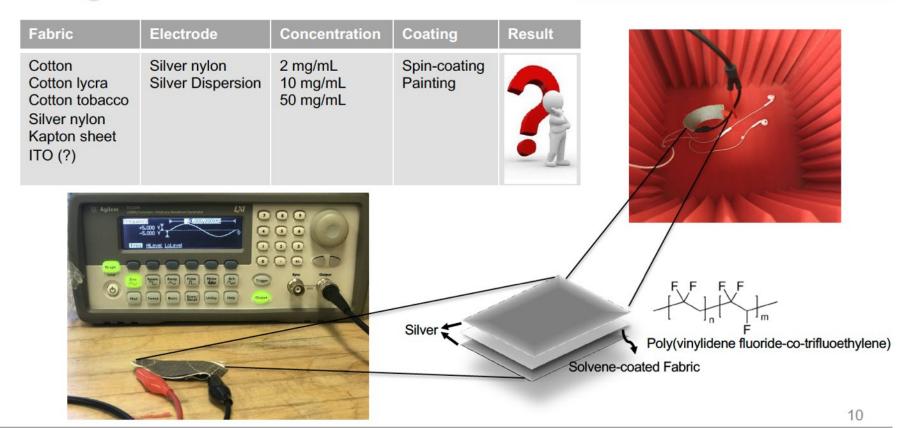
Trisha Andrew, PhD
Chemistry
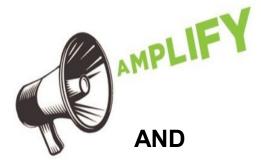Wearable Electronics Lab

Using Solvene-coated Fabrics

Fabric	Electrode	Concentration	Coating	Result
Cotton Cotton lycra Cotton tobacco Silver nylon Kapton sheet ITO (?)	Silver nylon Silver Dispersion	2 mg/mL 10 mg/mL 50 mg/mL	Spin-coating Painting	

Silver

Poly(vinylidene fluoride-co-trifluoethylene)

Solvene-coated Fabric

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Slide courtesy of Zohreh Homayounfar of Dr. Trisha Andrew's Lab, UMASS Amherst

GOALS

- Viable product that addresses an unmet need…………maybe

- *BUT ALSO*

- Level Power Hierarchies

- Raise Visibility of Community & Nursing

- Subvert & Transform the Invention Ecosystem

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