

CUWIP 01/18/15

From papergirl to physicist: The road less travelled

Suzanne White Brahmia

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I am...

- a courageous adventurer
- a world traveler and citizen
- a hiker
- a runner, cyclist and swimmer
- a soccer player
- a college teacher
- a physicist
- a mother
- a devoted daughter
- a youngest sister to four siblings
- an active listener
- a storyteller
- an aficionado for all that makes us human

Wordle version...



PER (Physics Education Research)

- Young branch of physics
- Focuses on researching student learning, curriculum development and the implementation of research-validated instructional methods in physics.

• PER faculty in physics departments across the country, for example:

Harvard Stanford U of Colorado

U of Washington Michigan State

Ohio State U of Az U of Maine U of Md

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Example of my work

[http://inventiontasks.physics.rutgers.edu/
Sample.html](http://inventiontasks.physics.rutgers.edu/Sample.html)

***Typical path
to academic career***

Bachelors degree
Graduate School - Physics
PhD - physics research
Post docs – more physics
research
Assistant professor – physics
research and teaching
Decades pass
Highest ranking professor

*My path
to academic career*

Bachelors degree
Peace Corps – HS Physics teaching
Job – Computer programmer
Graduate School – Physics
Masters - Experimental physics research
Academic position – physics teaching
and research about learning physics
20 years and three kids later
Graduate School – Physics (again)
MS – condensed matter physics research
(again)
& PhD - physics education research

The rest is under construction

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Six Decisions

- **Decision to join a single gender soccer team**
 - Joined because I liked to play
 - Getting better at it made me love to play - Self-efficacy and perseverance
 - The thrill group success outweighed to thrill of individual success
- - No job is beneath me.
 - There is satisfaction in doing any job well.
 - Kind people can really make your day.
 - Stunning the crabs with the love gun makes the shift worthwhile.
 - People who clean up after me deserve as much respect as the person who signs my paycheck. Or more.

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- **Decision to pursue jobs in service industry**
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Six Decisions

- **Decision to invest time and money in biking/hiking/skiing when I was poor**
 - The only way to your destination is by putting one sore foot in front of the other, even if your feet are numb with cold.
 - The triumph of the arrival at the destination makes you want to do it again.
 - Physics is everywhere, and having time to ponder it is a gift.
- - Picked it up because it seemed cool
 - Getting better at it made me love to play - Self-efficacy and perseverance
 - Creativity – the difference between playing notes and making music

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- **Decision to play the flute**
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 - Creativity – the difference between playing notes and making music

Six Decisions

- **Decision to stay in girl scouts**
 - How to convince people (to buy cookies)
 - How to build a fire
 - How to tie knots
 - Power of the sisterhood
- **Decision to take a pay cut to become a physics lackey**
 - Physicists are curious, creative and playful and much more interesting outside of a classroom.
 - Some physicists are not very good at communicating, but they are still nice people.
 - Doing anything in an area you are passionate about feels like being paid to play.
 - Mistakes are part of learning and there are many right ways to do many things.

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Seven truths

1. All goals can be broken down into a series of smaller goals.
2. Achievement is an important part of the human experience, and so is being a good citizen.
3. Sometimes saying no is more considerate than saying yes. Being overcommitted makes everyone unhappy.
4. Being an effective leader is a rare gift. Getting better at it is hard work and it makes you like leading more. Being asked to lead anything is an honor and a big responsibility.
5. Less experienced/skilled people play an increasingly important role in your happiness. The younger you are when you learn to value them, the happier you will be for the remainder of your life.
6. Bullies will always be part of life.
7. Honoring and valuing familial relationships and responsibilities is an essential part of being human.

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Truths based on decisions

- Big goals/small goals
 - *soccer, outdoor activities, flute, Girl Scouts, physics lackey*
- Achievements & citizenry
 - *soccer, service industry, outdoor activities, flute, Girl Scouts, physics lackey*
- Knowing limits/setting priorities
 - *soccer, outdoor activities, service industry, physics lackey*

Truths based on decisions (cont.)

- Leadership
 - *soccer, outdoor activities, flute*
- Humility
 - *soccer, service industry, physics lackey*
- Bullies
 - *soccer,, service industry*
- Familial relationships
 - *Girl Scouts, outdoor activities*

The road less traveled



The road less traveled (1)

- **Peace Corps**
 - Big goals/small goals
 - Achievement and citizenry
 - Limits and priorities
 - Leadership
 - Humility
 - Bullies
 - Familial relationships

The road less traveled (2)

- **Having children**
 - Familial relationships
 - Big goals/small goals
 - Achievement and citizenry
 - Limits and priorities
 - Leadership
 - Humility
 - Bullies

The road less traveled (3)

- **Leaving graduate school/entering workforce**
 - Limits and priorities
 - Familial relationships
 - Big goals/small goals
 - Achievement and citizenry
 - Leadership
 - Humility
 - Bullies

The road less traveled (4)

- **Midlife return to finish PhD**
 - Big goals/small goals
 - Achievement and citizenry
 - Limits and priorities
 - Familial relationships
 - Leadership
 - Humility
 - Bullies

Concluding comments

- **Understanding deeply what you like and don't like to do, and why, is underrated as a professional decision-making tool. Achievement follows passion. I love what I do because I bushwhacked the path to get here.**
- Bullies are part of life; they can be conquered through level-headed use of the system and undeniable achievement. Stun them with the love gun, or dazzle them with the smart gun, but never never never stoop to their level

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Concluding remarks (cont.)

- **Achievement big and small must always be on the horizon, and it feels good.**

“When you don't understand it and then you finally do, and you get this feeling of triumph.”

“...opened me up to a subject that I felt like I wouldn't ever be able to understand.”

“...has truly built my confidence to continue with this major and has opened my eyes to what I'm truly capable of.”

– *Sample email communications from various female students*

“Much as I hate to admit it right now, after you two have driven me crazy, I have to say the exam results are superb. ...Almost all questions show improvement, some big. Congratulations. We did something right.”

– Distinguished Professor of Physics, in charge of the course undergoing transformation

To be continued...

Thank You!