An academic path: me, my job and my research

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Assistant Professor
Electrical and Computer Engineering
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“Academic” path

1980
Childhood in Montreal

1992
High school

1997
Undergrad at McGill

2001
Japan
Ph.D + postdoc at Harvard

2002

2008
World

2009
Assistant professor at UIC

Thursday, November 12, 2009
KEY Factors:

Professor Avis
Professor Toussaint
Professor Chvatal
Professor Gyorfy
......

KEY LESSONS LEARNED:

Importance of role models

Math is fun!
KEY Factors:

+ Peers
+ Parents

KEY LESSONS LEARNED:

Importance of some competition
Math is (still) fun!
Nerdy is OK / great
KEY Factors:

- Women approach things differently
- Engineering is (also) fun!
- Stand out in a good way

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KEY Factors:

Don’t judge a woman by her...?
Taking (some) time off is good for you (+ science)

KEY LESSONS LEARNED:
KEY Factors:

KEY LESSONS LEARNED:

Learn your strengths
Importance of female peers
Sticking out is definitely a plus
KEY Factors:

Importance of female peers
Great time to be a woman in science!!

KEY LESSONS LEARNED:

Play to your strengths
Importance of female peers
Great time to be a woman in science!!

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``Assistant Professor'' at UIC
What do I do?

``Assistant Professor” at UIC

40% Teach: 1-2 courses per semester  (Lecturer vs. professors)

40% Research: with colleagues, undergraduate, Master’s, Ph.D. students write grants (get $$ for my research - like a scholarship)

20% Service: conferences, reviewers, committees

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What is teaching?

You all know
What is research?

It's an entire process

DICTIONARY DEFINITION

RE-SEARCH

Function: noun, verb transitive
Etymology: Middle French recerche, from recerchier to investigate thoroughly, from Old French, from re- + cerchier to search
Date: 1577
1. to search or investigate exhaustively
2. studious inquiry or examination; especially : investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws
3. the collecting of information about a particular subject

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Learn! Discover!

Go where no-one has gone before! Innovate!
What do I research?

- Engineering =
- Electrical engineering =
- Wireless communications =
- Information theory =
But why?

Electromagnetic Spectrum

\[ f = \frac{c}{\lambda} \]

\[ \lambda = \text{Wavelength} \]

\[ f = \frac{c}{\lambda} \]
Electromagnetic Spectrum

\[ f = \frac{c}{\lambda} \]

- Gamma-rays
- X-rays
- Ultraviolet
- Visible
- Near IR
- Infra-red
- Thermal IR
- Far IR
- Microwaves
- Radar
- Radio, TV
- AM
- Long-waves

- UHF
- VHF
- FM
- AM

Frequency (Hz)

0.1 Å
1 Å
0.1 nm
1 nm
10 nm
100 nm
1 μm
10 μm
100 μm
1 mm
1 cm
10 cm
1 m
10 m
100 m
1000 m

Wavelength

400 nm
500 nm
600 nm
700 nm
1000 nm
1 μm
10 μm
100 μm
1 mm
1 cm
1 m
10 m
100 m
1000 m

Louis E. Keener - Coastal Carolina University

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Electromagnetic Spectrum

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The Electromagnetic Spectrum

\[ f = \frac{c}{\lambda} \]

- **Gamma-rays**
- **X-rays**
- **Ultraviolet**
- **Visible Light**
- **Near Infrared (IR)**
- **Infra-red (IR)**
- **Thermal IR**
- **Far IR**

Frequency (Hz) vs. Wavelength

- 0.1 Å
- 1 Å
- 0.1 nm
- 1 nm
- 10 nm
- 100 nm
- 1 μm
- 10 μm
- 100 μm
- 1 mm
- 1 cm
- 10 cm
- 1 m
- 10 m
- 100 m
- 1 km
- 1000 m

**Frequencies**

- **1000 MHz**
- **500 MHz**
- **100 MHz**
- **50 MHz**

**Radio, TV**

**VHF**

- **7-15 MHz**

**UHF**

- **2-6 MHz**

**Long-waves**

This diagram illustrates the various types of electromagnetic radiation and their corresponding frequencies and wavelengths.
The diagram illustrates the Electromagnetic Spectrum with frequency and wavelength on the axes. Key regions include:

- **Gamma-rays**
- **X-rays**
- **Ultraviolet**
- **Visible light**
- **Infrared** (Near IR, Far IR)
- **Thermal IR**

Frequency and wavelength values are provided for various regions, such as:

- **Gamma-rays**: $10^{19}$ Hz, $0.1 \text{Å}$
- **X-rays**: $10^{18}$ Hz, $1 \text{Å}$
- **Ultraviolet**: $10^{17}$ Hz, $1 \text{nm}$
- **Visible light**: $10^{16}$ Hz, $1 \text{nm}$ to $700 \text{nm}$
- **Infrared**: $10^{15}$ Hz, $1 \text{cm}$ to $1 \text{mm}$

Frequency and wavelength values are also given for lower frequencies:

- **Radar**: $10^{9}$ Hz, $1 \text{m}$
- **Radio, TV**: $10^{8}$ Hz, $1 \text{km}$
- **Long-waves**: $10^{6}$ Hz, $1 \text{km}$

The diagram credits Louis E. Keener, Coastal Carolina University.
Electromagnetic Spectrum

\[ f = \frac{c}{\lambda} \]

Used for "radio" communication!
Unused spectrum?
Goal

``Assistant Professor'' at UIC

Find more efficient ways of communicating wirelessly!

Especially in wireless networks....
Questions, now or later, are most welcome

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