



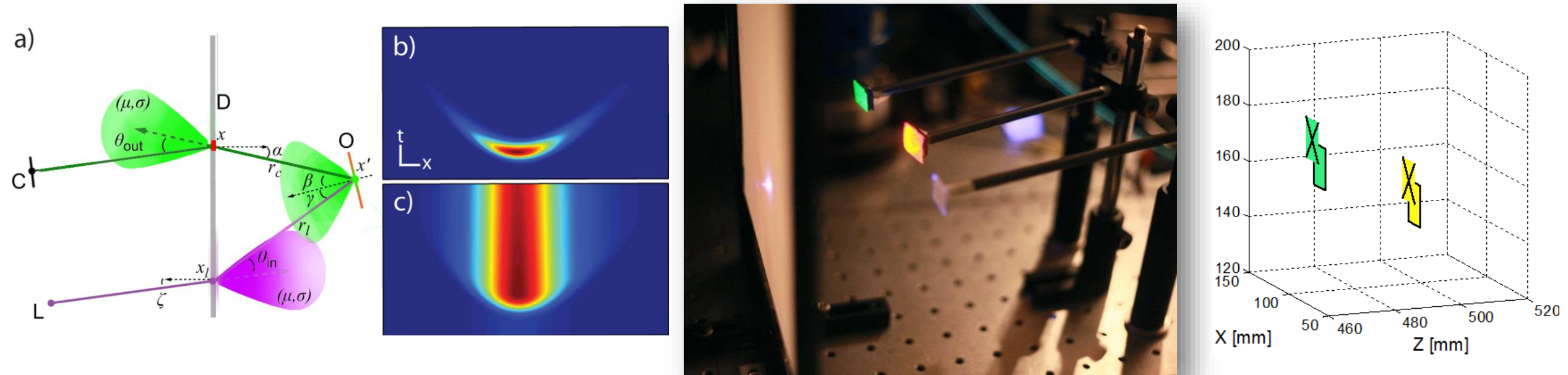
# Guy Satat

March, 2015

# Locating and classifying fluorescent tags behind turbid layers using time-resolved inversion

Fluorescence lifetime imaging is attractive for imaging through complex media but early photons location and fluorescence lifetime has not been used simultaneously.

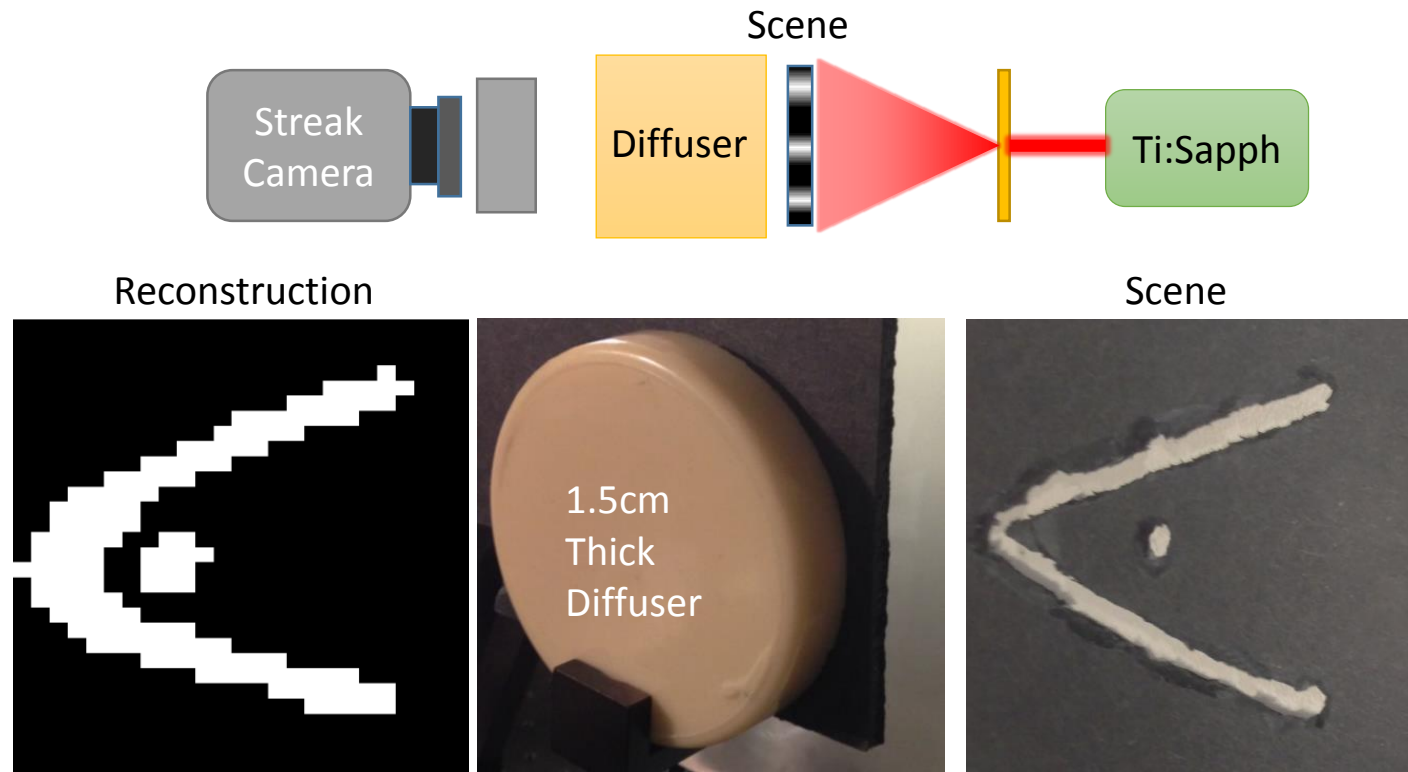
Here, we use time-resolved, sparse optimization inversion to reconstruct location and lifetime of fluorescent markers behind turbid media



Signal processing, Compressed sensing, Inverse problems, Ultrafast measurements, Streak camera

# Imaging Behind Thick Scattering Media

Using time resolved measurements and optimization framework we demonstrate reconstruction of a hidden scene behind 1.5cm thick tissue phantom

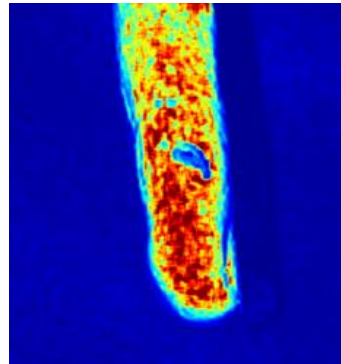
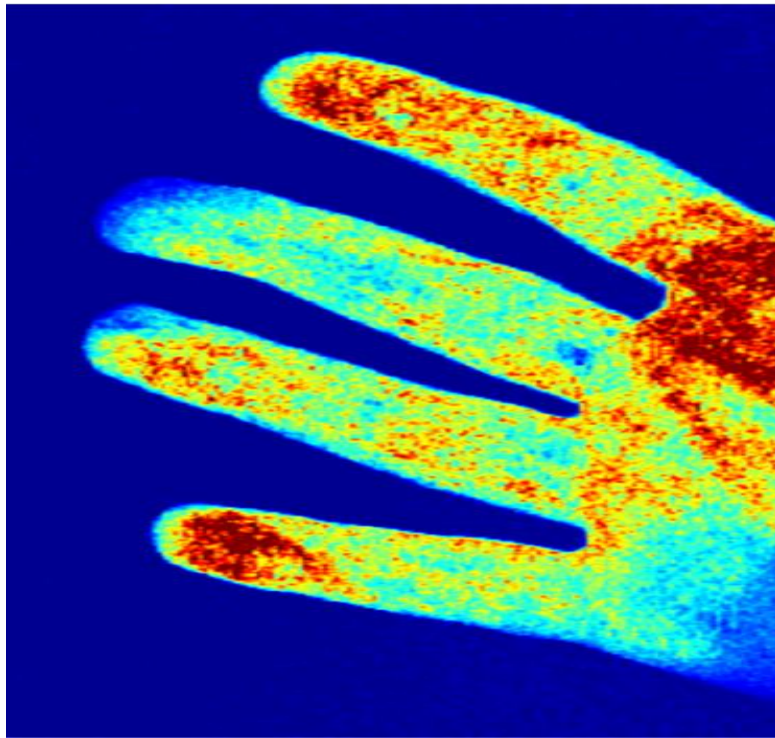


Signal processing, Optimization, Inverse problems, Ultrafast measurements, Streak camera

# Skin Perfusion Photography

Perfusion is the process in which blood flows into our tissues.

In this work we developed a new method to measure the speed of blood flow in skin tissue.



Computational photography, Coherent imaging, Medical imaging, Image processing, Speckle



# Re-inventing the Stethoscope

A device for automatic diagnosis of lung murmurs.



A low cost device for automatic diagnosis of hearth murmurs.



Signal processing, Machine learning, Electronics, Audio, Medical devices

# Glasses Free Display

Pure software solution to put the glasses on the display

Perceived from standard display

Memristors are a novel circuit element, predicted in 1971 by Leon Chua and produced in 2008 by HP labs. Their main attribute is a varying resistance with memory, hence the name memristor. So far the main applications explored for memristors where in the field of memory arrays. (Arial 20)

Perceived from suggested display

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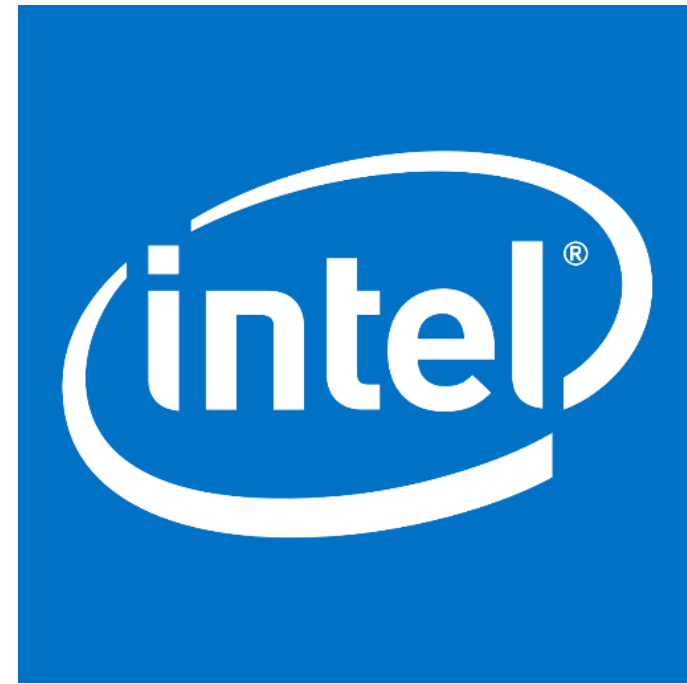
Actual image displayed

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Image processing, Inverse problems, Human visual system, Psychological effects

# Intel

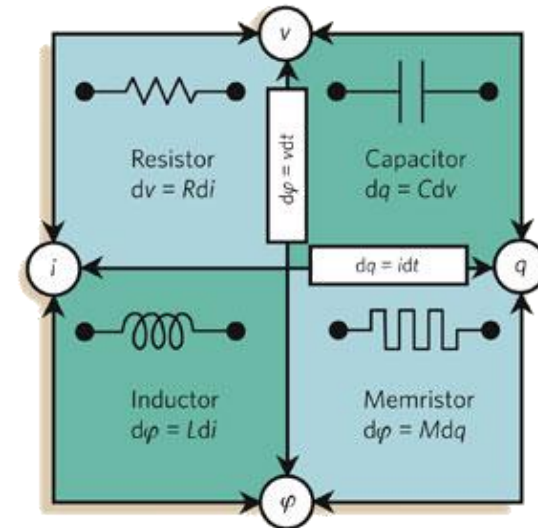
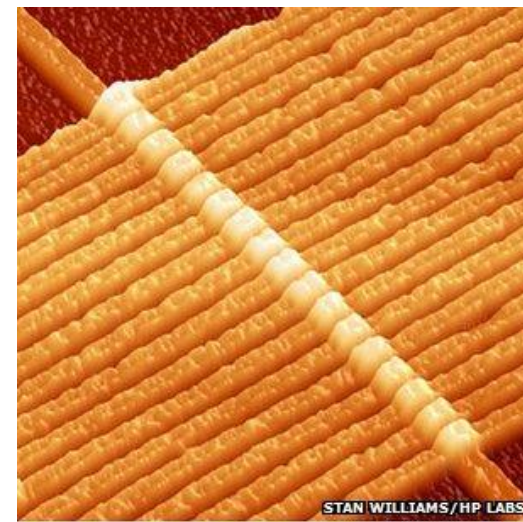
- CPU Architect (Interconnect)
- Close work with other architecture, design, verification, and performance teams
- Global routing optimization algorithm for heterogeneous workloads
- Adaptive admission control for on die interconnect (patent)
- Internal communication interconnect scalability (patent)
- Memory hierarchy optimization for imaging pipeline



CPU Architecture, Interconnect, Imaging pipeline, Memory hierarchy, Data mining, System analysis  
Verilog, C#, System C

# Memristors

- Logic with Memristors:
  - Analysis of different methods to implement logic gates with Memristors
  - New method suggested and patented (MAGIC)
- New multithreaded CPU pipeline with Memristors
  - Optimized multithreaded switch-on-event (SoE) pipeline with new memory elements
  - Full design in Verilog



VLSI, Analog design, System analysis, CPU architecture, Verilog

S. Kvatinsky, D. Belousov, S. Liman, **G. Satat**, N. Wald, E.G. Friedman, A. Kolodny, U.C. Weiser, "MAGIC – Memristor Aided LoGIC," *IEEE Transactions on Circuits and Systems II: Express Briefs*, Vol. 61, No. 11, pp. 1-5, November 2014.

S. Kvatinsky, **G. Satat**, N. Wald, E. G. Friedman, A. Kolodny, and U. C. Weiser, "Memristor-based Material Implication (IMPLY) Logic: Design Principles and Methodologies," *IEEE Transactions on Very Large Scale Integration (VLSI)*, Vol. 22, No. 10, pp. 2054-2066, October 2014.

A pure memristive logic gate, US patent 14/641,482.