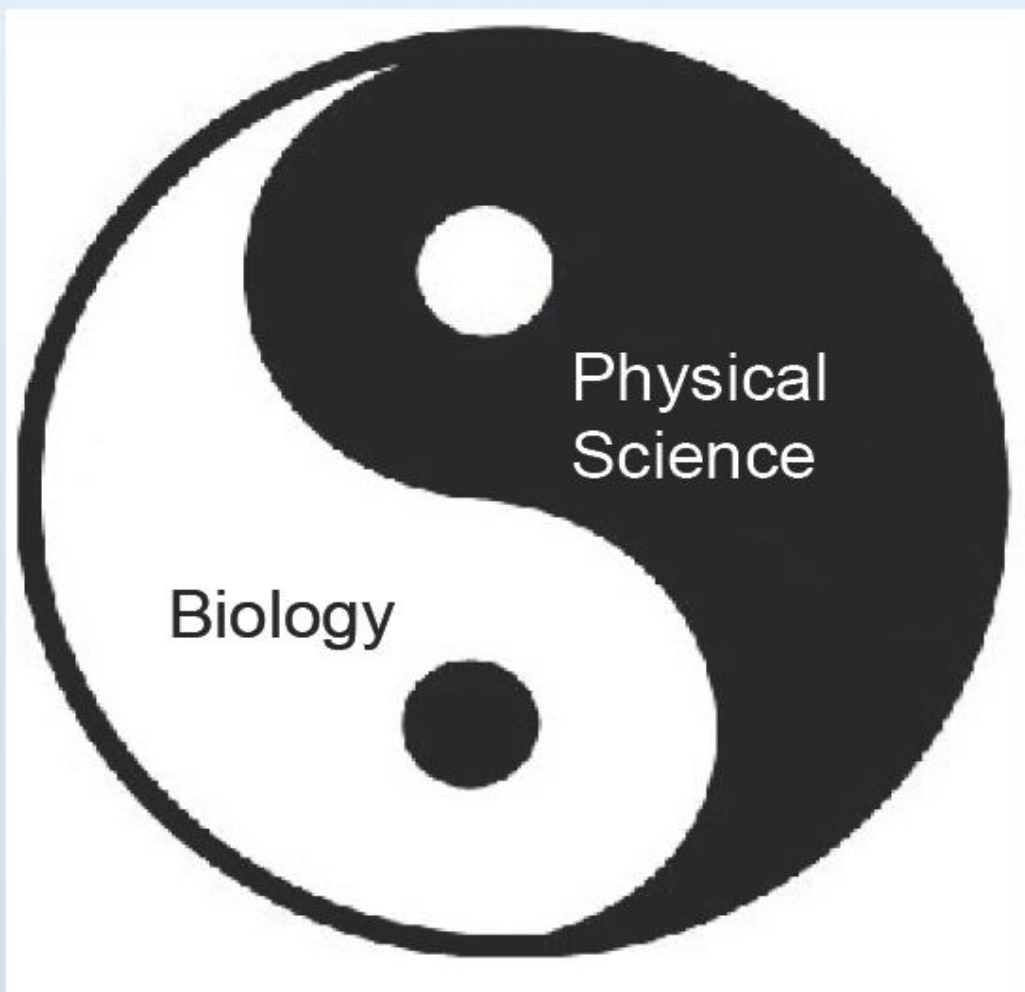


SRC Meeting

Rudy Juliano PhD

Cary C. Boshamer Distinguished Professor
Assoc. Dean for Research & Graduate Education
UNC Eshelman School of Pharmacy

The Marriage of Carbon & Silicon



Some of the things that Microelectronics has done for Biology: the Genome

Map Viewer

http://www.ncbi.nlm.nih.gov/mapview/maps.cgi?taxid=9606&chr=1

Go to ScienceDirect... Evaluate it! Oligonucleotide Ther... Pubmed Home

Fed Adds to Its Efforts to Aid C... Google Image Result for http://... Map Viewer

NCBI NCBI Map Viewer

PubMed Entrez BLAST OMIM Taxonomy Structure

Search Find Find in This View Advanced Search

Human genome overview page (Build 36.3) Human genome overview page (Build 35.1) Map Viewer Home

Map Viewer Help Human Maps Help FTP Data As Table View Maps & Options Compress Map Region Shown: Go

out zoom in You are here: Ideogram

default master

Homo sapiens (human) Build 36.3 (Current) [BLAST The Human Genome](#)

Chromosome: [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 X Y MT]

Master Map: Genes On Sequence [Summary of Maps](#) [Maps & Options](#)

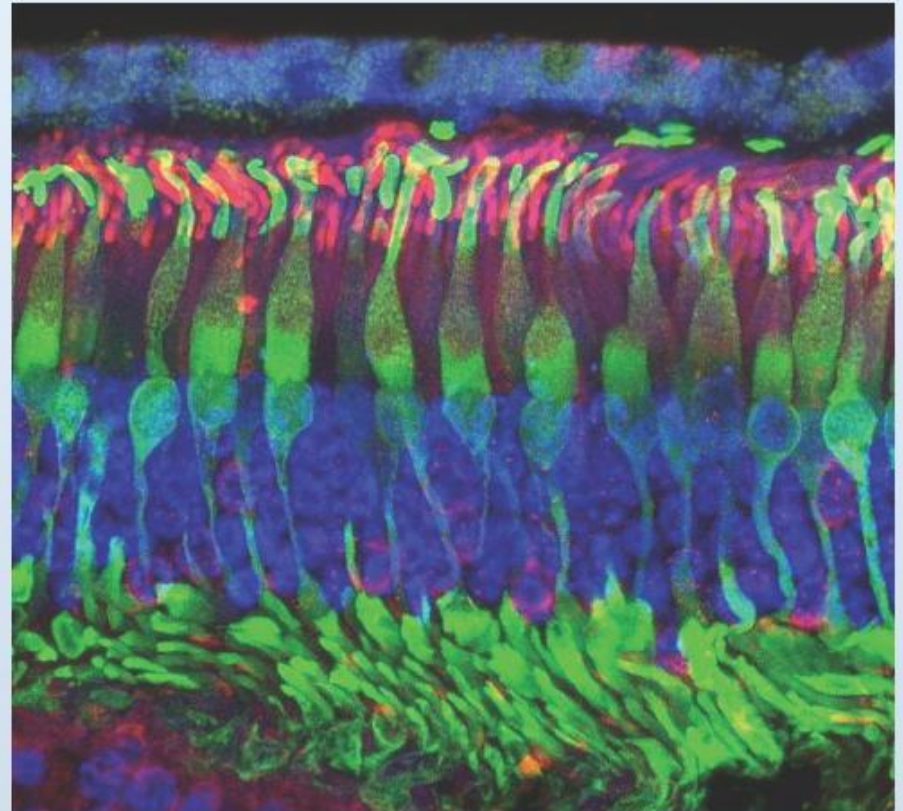
Region Displayed: 0-247M bp [Download/View Sequence/Evidence](#)

Ideogram	Contig	Hs UniG	Genes_seq	Symbol	Q	Links	E	Cyto	I
	NT_027842			MFN2	+	OMIMHGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1p36.22	r
	NT_027811	Hs_17146		AKR7A3	+	OMIMHGNC sv pr dl ev mm hm	CCDS SNP best RefSeq	1p35.1-p36.23	a
	NT_044201	Hs_10654		MAN1C1	+	HGNC sv pr dl ev mm hm sts	CCDS SNP mRNA	1p35	r
	NT_041527	Hs_370858		MRPS6P1	+	sv dl ev mm	best RefSeq	1p35	r
	NT_021587	Hs_140544		SCP2	+	OMIMHGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1p32	s
	NT_110791	Hs_20990		PCSK9	+	OMIMHGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1p32.3	f
	NT_027382	Hs_270602		FOXD3	+	OMIMHGNC sv pr dl ev mm hm	CCDS SNP best RefSeq	1p32-p31	f
	NT_046110	Hs_132204		GIPC2	+	HGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1p31.1	C
	MT_002077	Hs_425560		LOC100129620	+	sv dl ev mm	mRNA	1p21.3	s
	NT_110792	Hs_173723		GSTM2	+	OMIMHGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1p13.3	g
	NT_029275	Hs_510676		THEM4	+	OMIMHGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1q21	d
	NT_066560	Hs_23298		SCARNA4	+	HGNC sv dl ev mm	best RefSeq	1q22	s
	NT_027380	Hs_295404		NTRK1	+	OMIMHGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1q21-q22	r
	NT_110794	Hs_494404		QR10T1P	+	HGNC sv dl ev mm	best RefSeq	1q23.1	c
	NT_110795	Hs_402736		TOMM40L	+	HGNC sv pr dl ev mm hm sts	CCDS SNP best RefSeq	1q23.3	t
	NT_110796	Hs_18838		APOBEC4	+	OMIMHGNC sv pr dl ev mm hm	CCDS SNP best RefSeq	1q25.3	a
	NT_110797	Hs_210649		PTPRV	+	HGNC sv dl ev mm sts	best RefSeq	1q32.1	p
	NT_044107	Hs_104407		PPFIA4	+	OMIMHGNC sv pr dl ev mm hm sts	SNP best RefSeq	1q32.1	p
	NT_066492	Hs_209223		CR1L	+	OMIMHGNC sv pr dl ev mm hm sts	SNP best RefSeq	1q32.1	c
	NT_001077	Hs_160440		LOC728528	+	sv pr dl ev mm hm	SNP protein	1q41	s

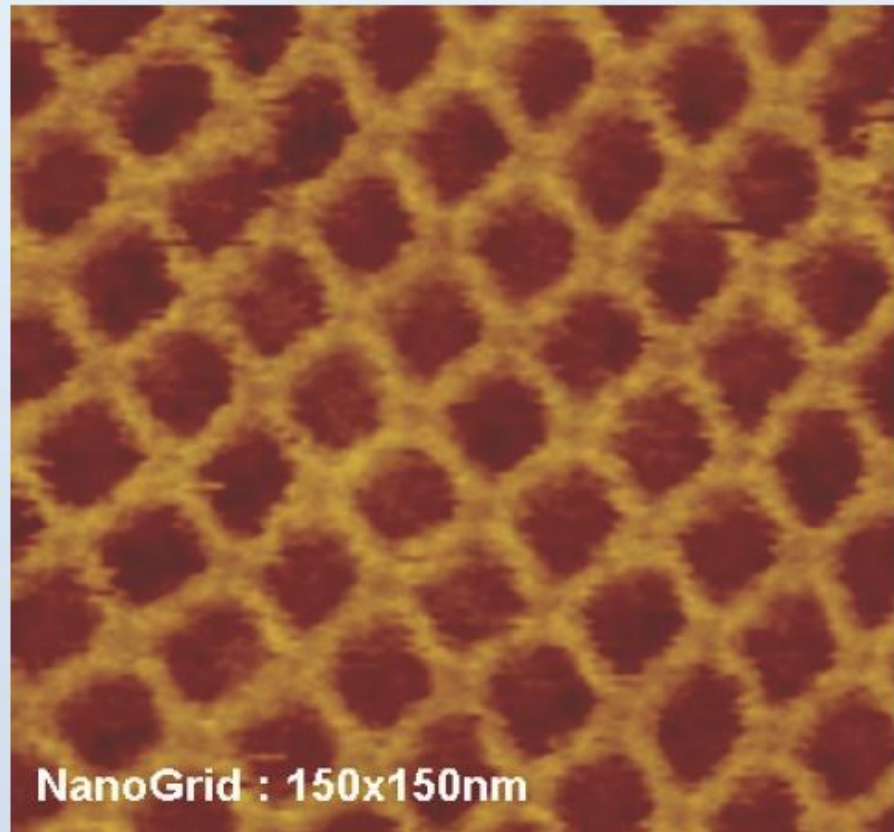
Summary of Maps:
 Map 1: Ideogram
 Region Displayed: 1pter-1qter
 Map 2: Contig
 Region Displayed: 0-247M bp
 Total Contigs On Chromosome: 39 [10 not localized]

[Table View](#) [Download/View Sequence/Evidence](#)

Some of the things that Microelectronics has done for Biology: **Sophisticated Imaging of Living Cells**

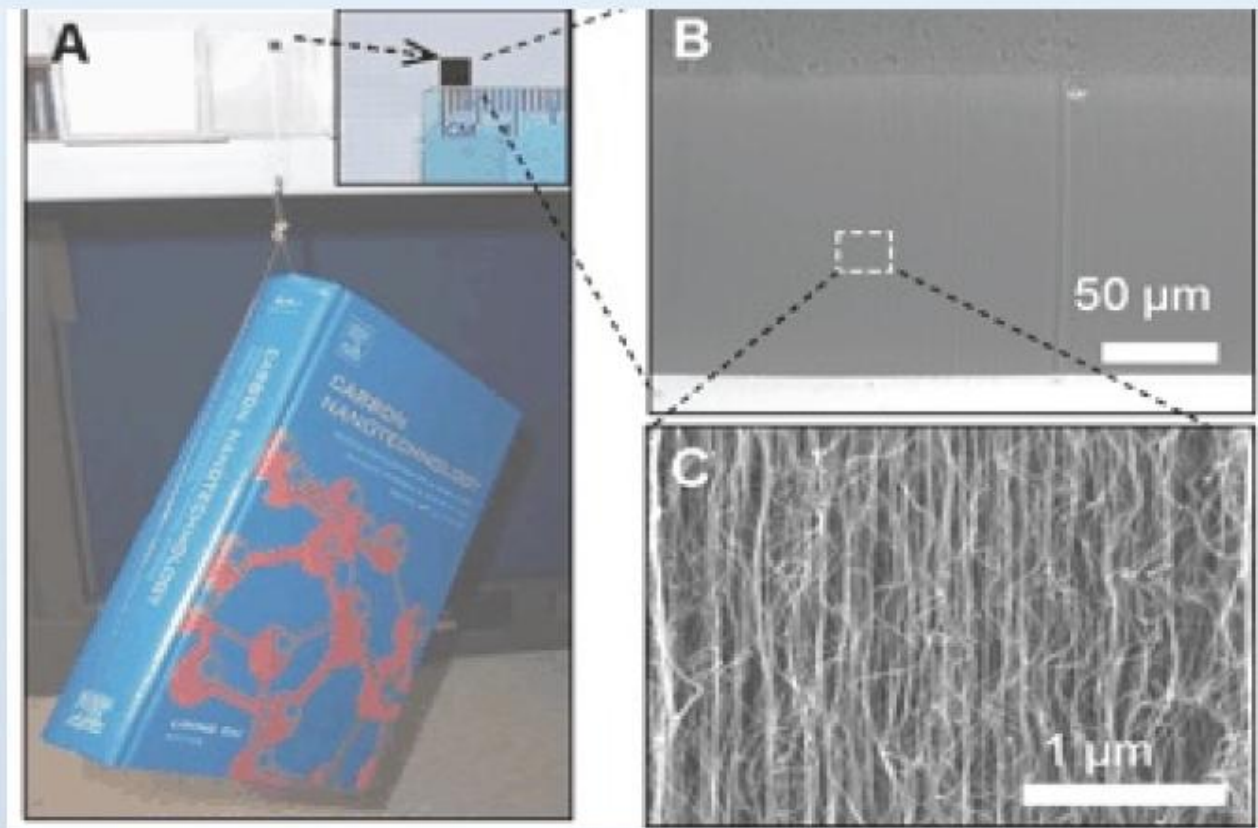


Some of the things that Biology might do for Microelectronics
Biomolecule Based Self Assembly



DNA Based Nanowires

Some of the things that Biology might do for Microelectronics **Biomimetic Design**



“ Gecko Foot” CNT Adhesive

SCIENCE 10 Oct 2008 p238

A Local Examples of the Interface Between Physical Science/Biological Science



National Cancer Institute

NCI Alliance for
Nanotechnology
in Cancer

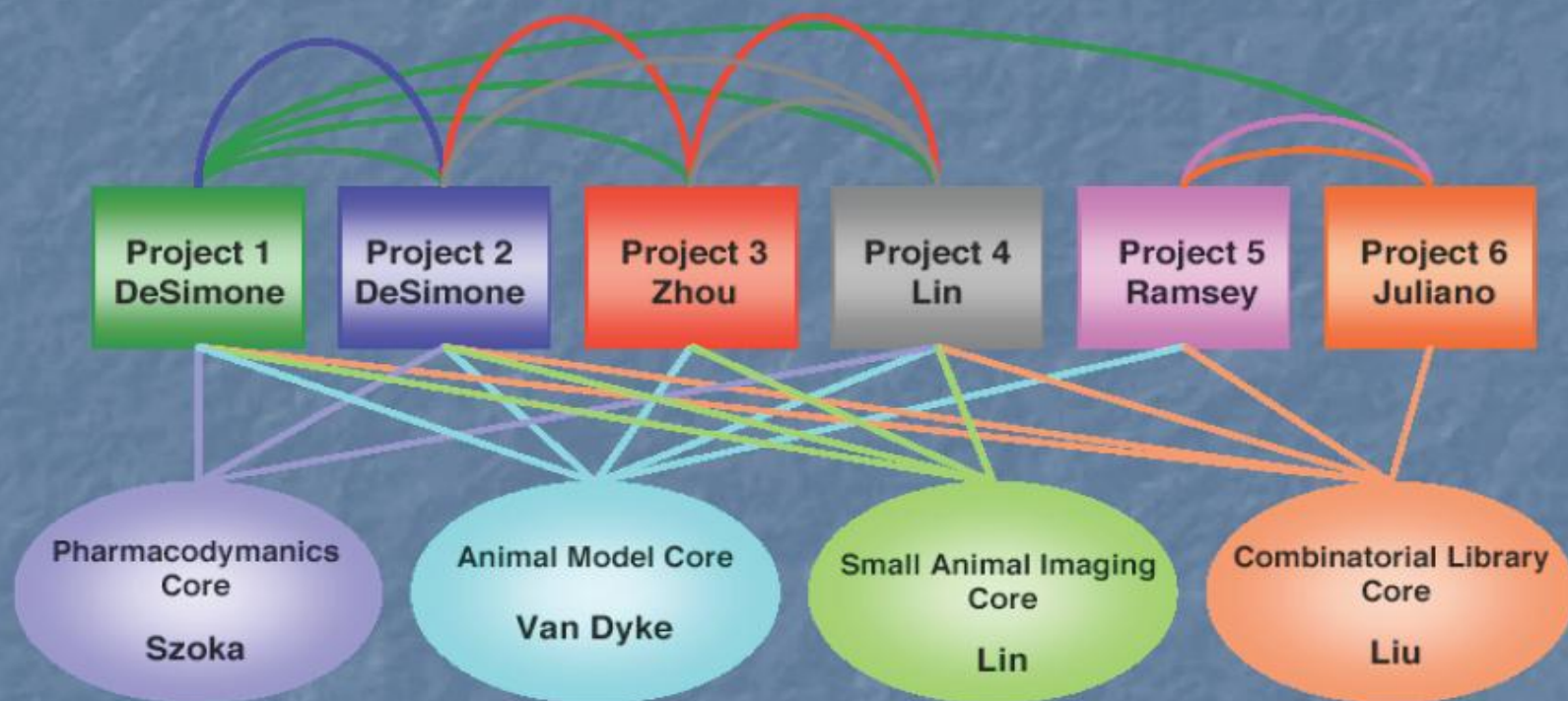
Transforming

Centers of Cancer Nanotechnology Excellence

- 1. University of North Carolina**
2. Harvard-MIT
3. Northwestern
4. Emory-Georgia Tech
5. Washington University
6. CalTech-UCLA
7. University of California San Diego
8. Stanford

Carolina Center Of Cancer Nanotechnology Excellence

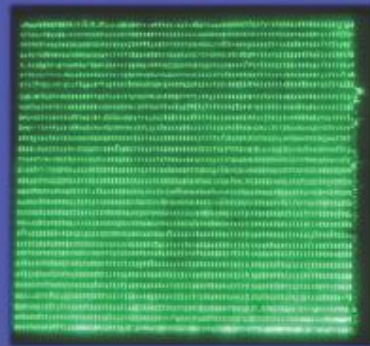
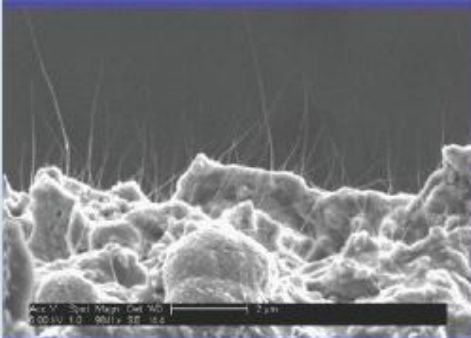
Rudy Juliano, PI & Joe Desimone, Co-PI



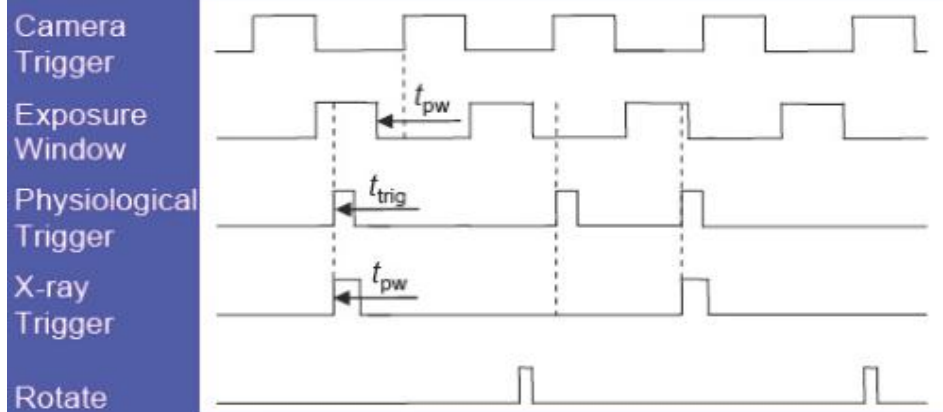


Nanotube X-Ray for *in-vivo* Cancer Detection and Treatment

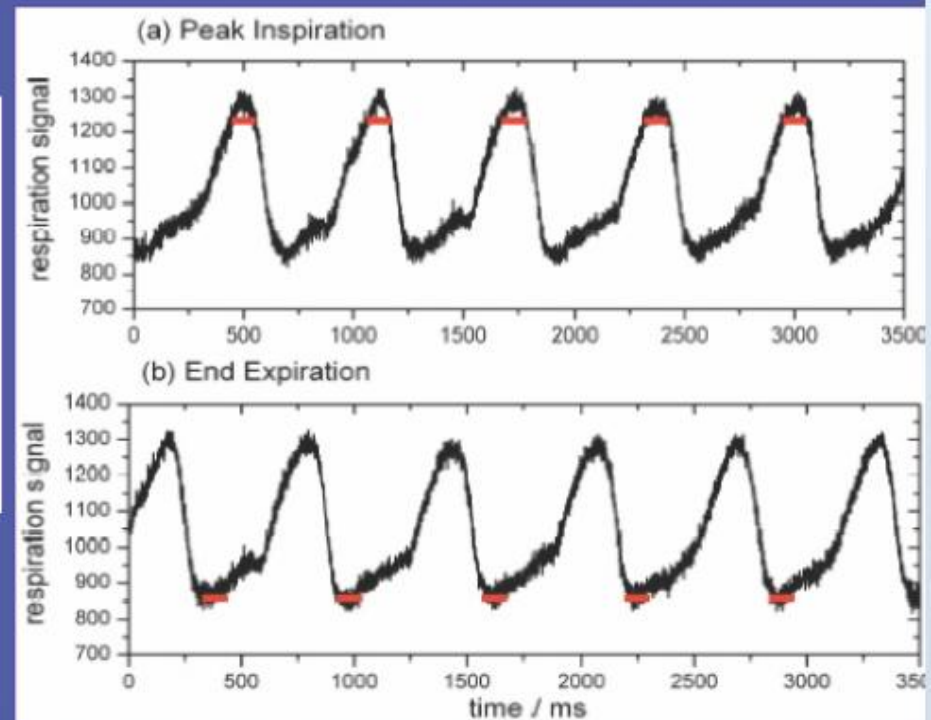
Physical Science: Otto Zhou (Phys), Jianping Lu (Phys), David Lalush (BME)
Health Science: Sha Chang (RadOnc), Etta Pisano (Rad),
Kay Lund (Cancer Biology), Yue Xiong (Cancer Biology)



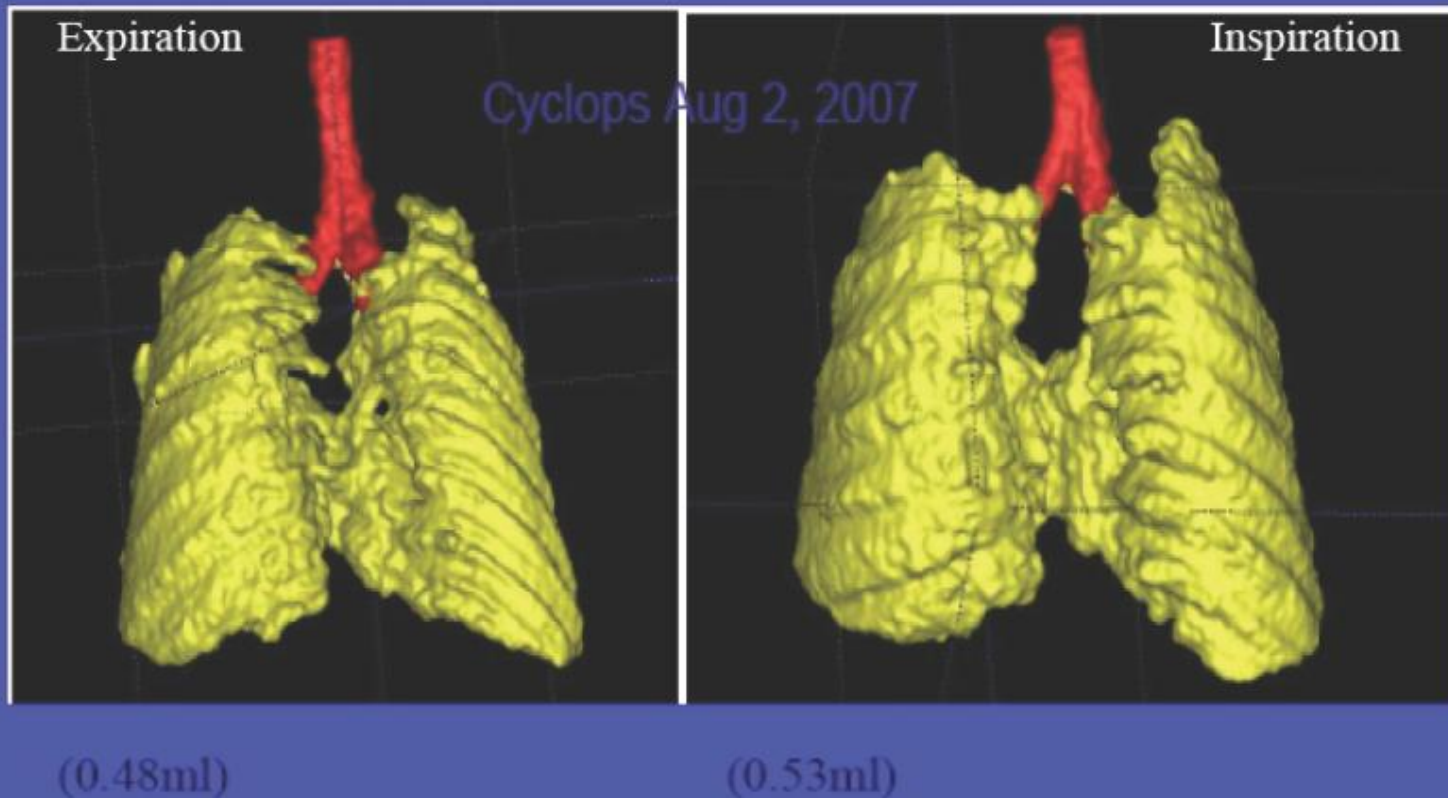
Dynamic micro-CT imaging of *free-breathing* anesthetized mice



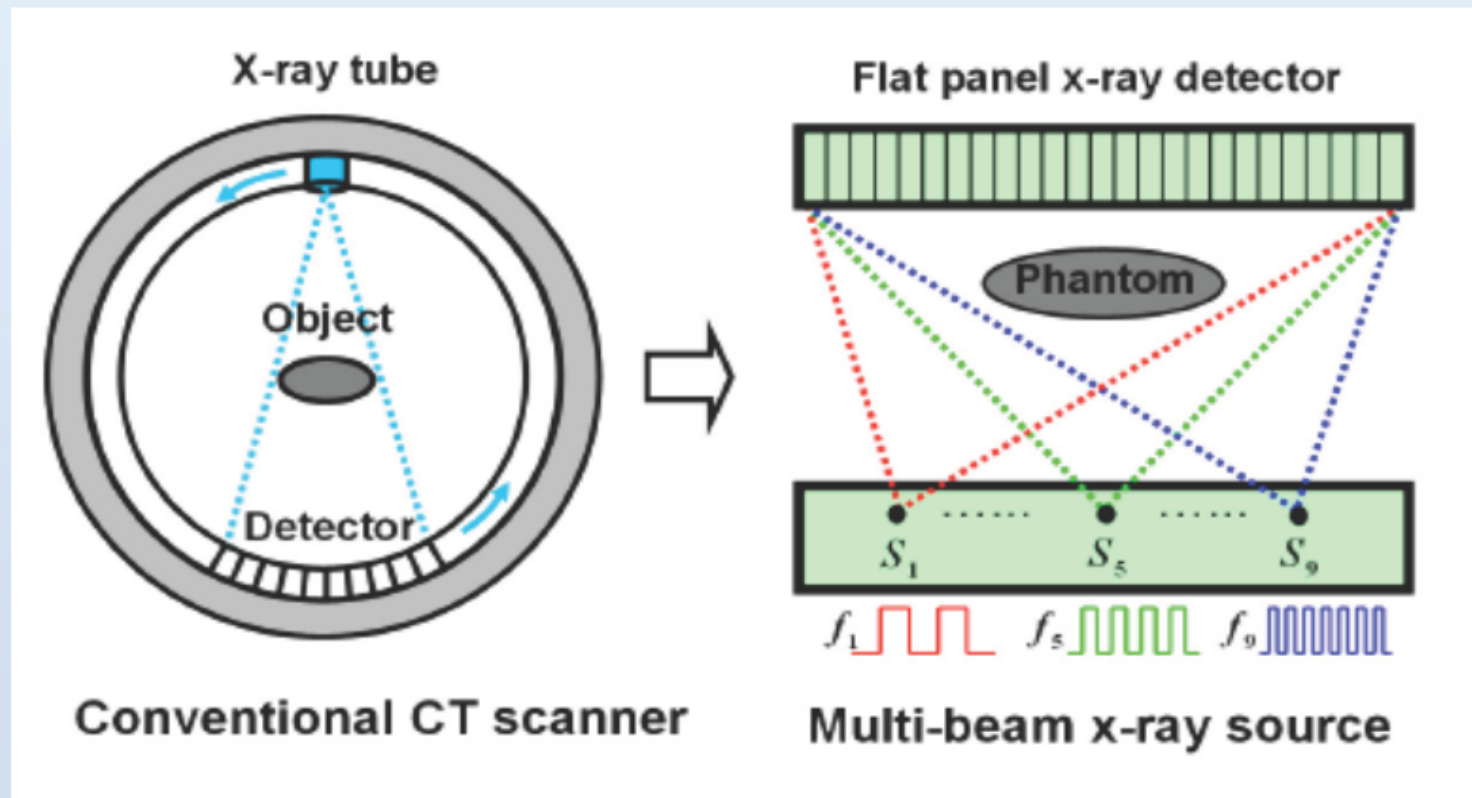
Note: t_{pw} – x ray pulse width t_{trig} – physiological trigger duration



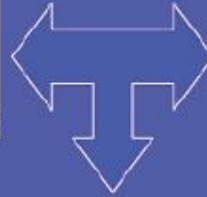
Respiratory-gated micro-CT of an anesthetized mouse at free breathing condition



A Key Aspect of CNT X-ray: Tomography Without Moving Source (or Patient)



Road to clinic



SIEMENS



“Real-time” image guide radiation therapy

Clinical test in 2009



The Marriage of Carbon & Silicon

