
EXIT
Center for Commericalization of Fluore
Short Course on
Cellular and Molecular Flu
Nov. 26-30, 200


Center for Commericalization of Fluorescence Technologies
Short Course on:
Cellular and Molecular Fluorescence
Nov. 26-30, 2007
e Principles I: David James
tion and Emission Spectra
Intrinsic and Extrinsic
rophores


Center for Commericalization of Fluorescence Technologies
Short Course on:
Cellular and Molecular Fluorescence
Nov. 26-30, 2007
Basic Fluorescence Principles I: David Jameson
Absorption, Excitation and Emission Spectra,
Quantum Yields, Intrinsic and Extrinsic
Fluorophores


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Why fluorescence?
• its pretty!
• it provides information on the molecular environment
• it provides information on dynamic processes on the nanosecond timescale
ions
electric fields
temperature
Fluorescent Probe
viscosity
pH
polarity


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Nanocrystal


ng in vivo
sh the vasculature of individual
s.
been identified, purified and
of the peptides directed the
s to the appropriate site in the
showing that nanocrystals can
rgeted in vivo with an exquisite
specificity.
Schematic representation of
targeting. Intravenous delivery of
into specific tissues of the mouse.
were coated with either peptides
r with peptides and PEG. PEG
the Qdots maintain solubility in
us solvents and minimize
ecific binding.
200A
STORAGE


Irina Akopo


Center for BioHealth
200
201
202
275


TCON


Sprite


COOKS
BUNN


COKE


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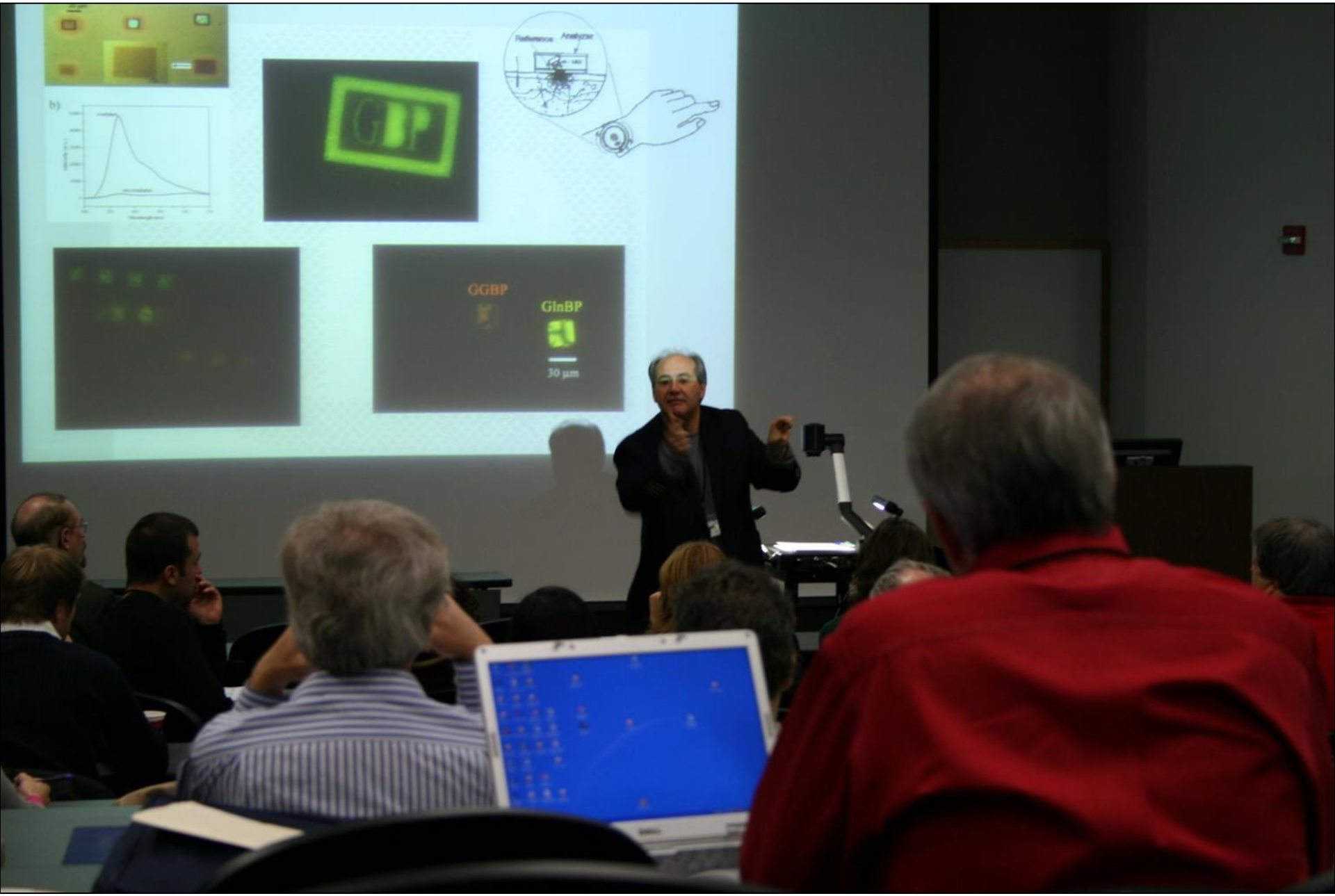
The binding-protein family has a structure organized
in two main domains
that forms the ligand-bind site


b)
GBP
GGBP
GlnBP
30 µm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Total Internal Reflection Fluorescence Microscopy
Principles
Excitation
1. Plane wave refraction/reflection at glass/water interface for TIR
2. Propagation, phase, polarization, and intensity of the evanescent electric field
3. Incidence angle and evanescent illumination penetration depth
4. Metal film at the glass/water interface and surface plasmon resonance
Emission
1. Dipole emitter near and far-field
2. Plane wave expansion facilitating refraction/reflection at an interface
3. Manifestations of the near-field
4. Emission intensity vs polar angle
5. Emission intensity into a 1.45 NA objective vs dipole distance to interface


Total Internal Reflection Fluorescence Microscopy
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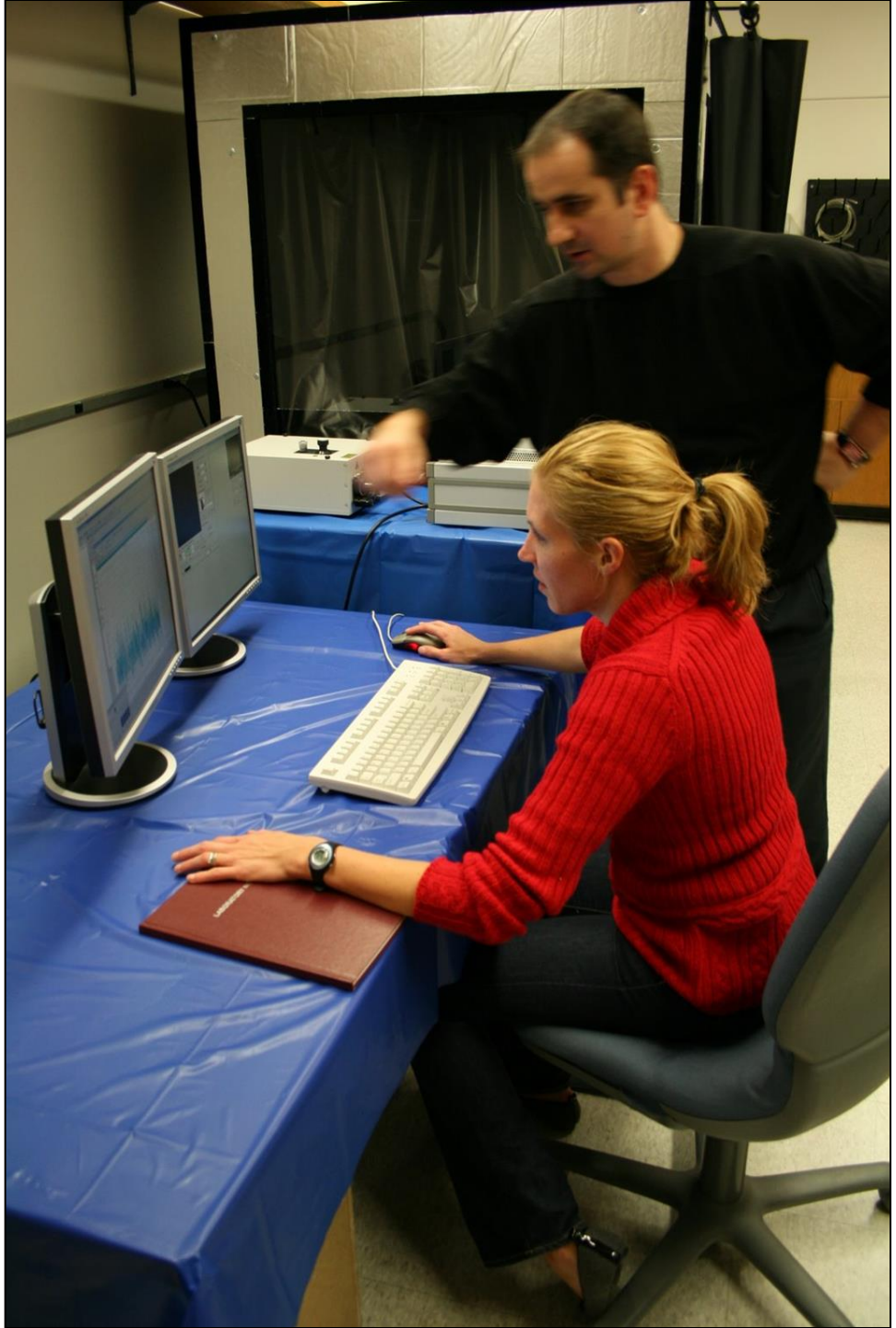
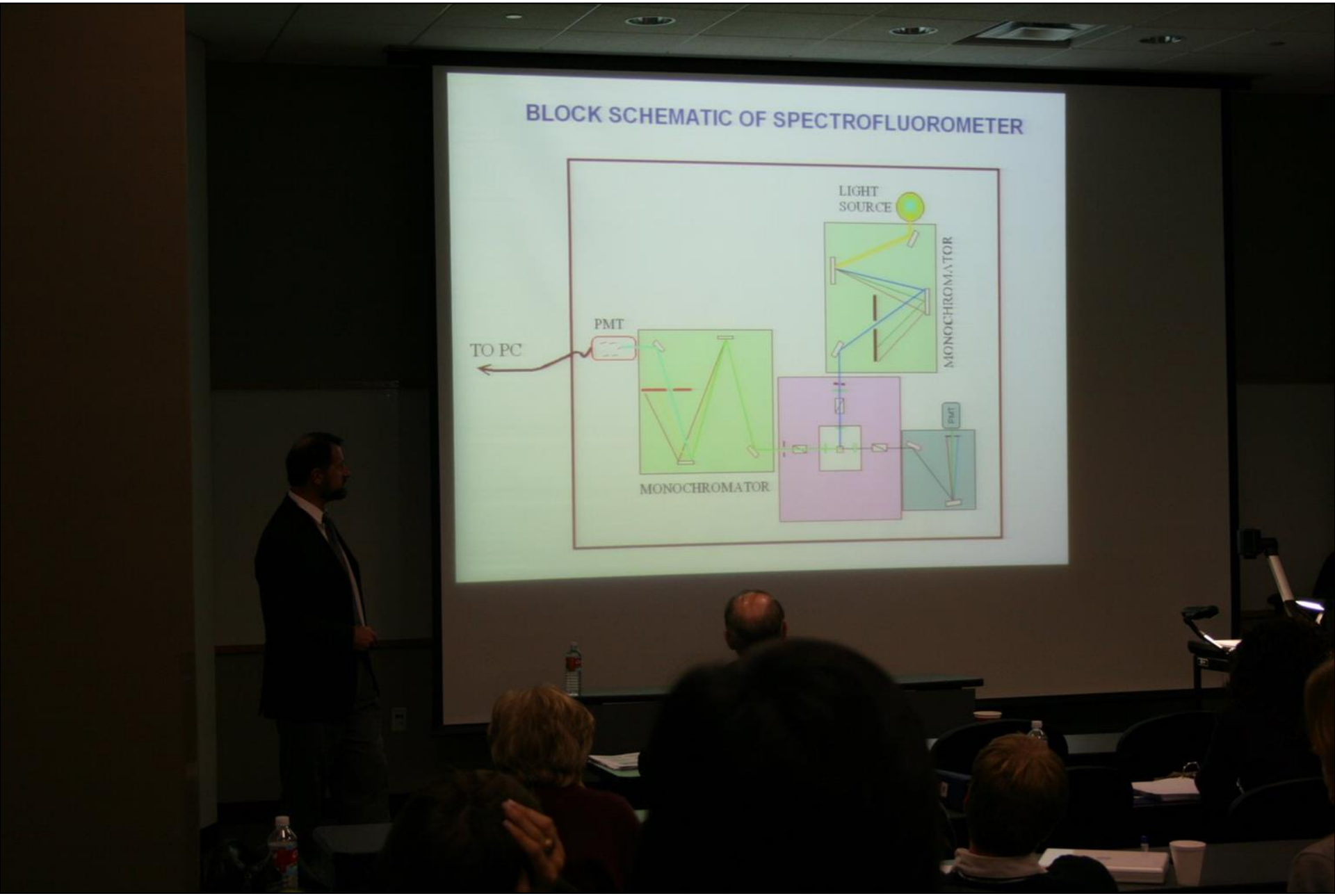
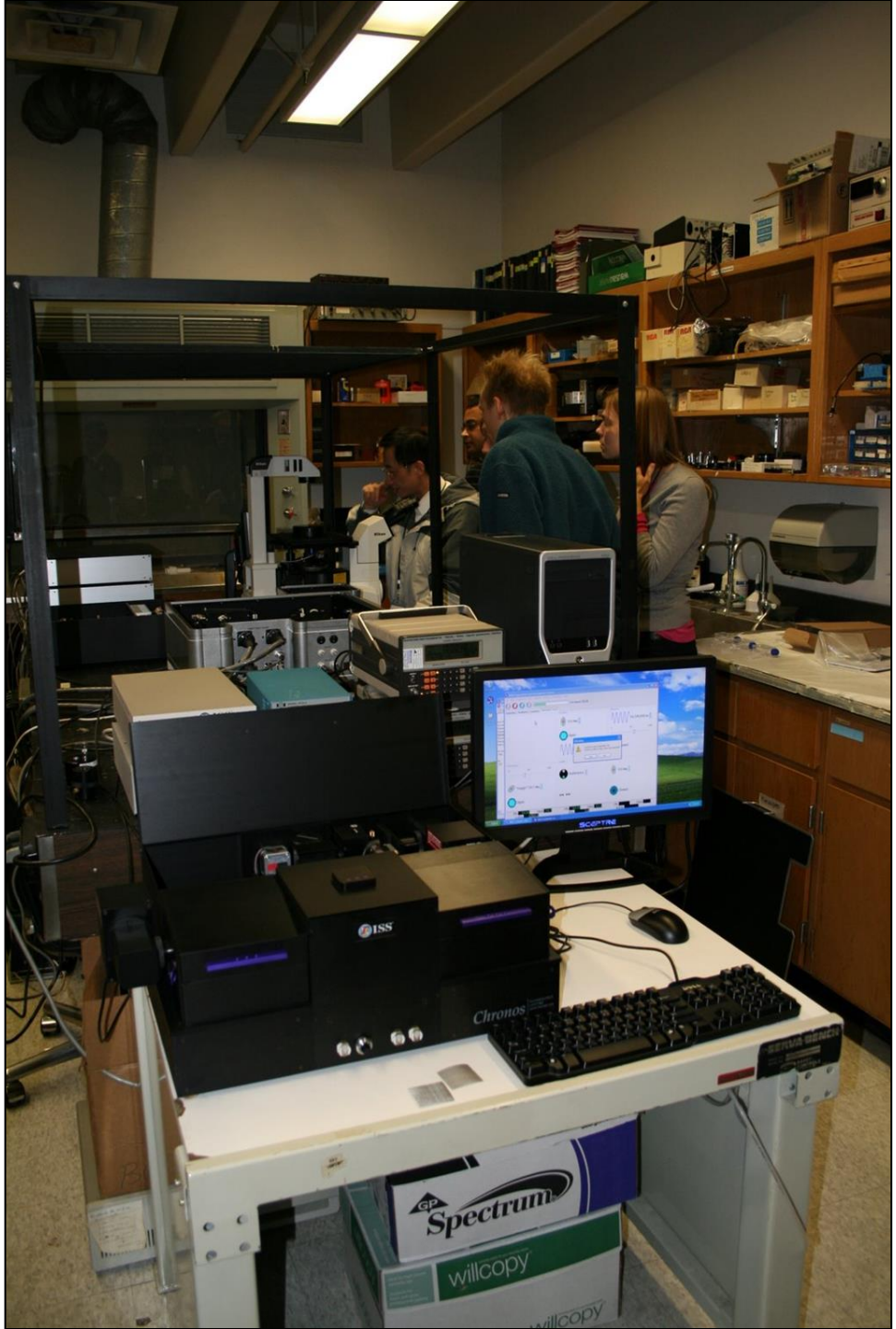



Future Nanomedicine and Diagnostics


BLOCK SCHEMATIC OF SPECTROFLUOROMETER
LIGHT SOURCE
MONOCHROMATOR
PMT
TO PC
MONOCHROMATOR
PMT


Multi-Photon Induced
Fluorescence Spectroscopy
Ignacy Gryczynski
Center for Commercialization of Fluorescence Technologies
UNIVERSITY OF NORTH TEXAS HEALTH SCIENCE CENTER
FORT WORTH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Chronos
SCEPTRE
GP Spectrum
willcopy


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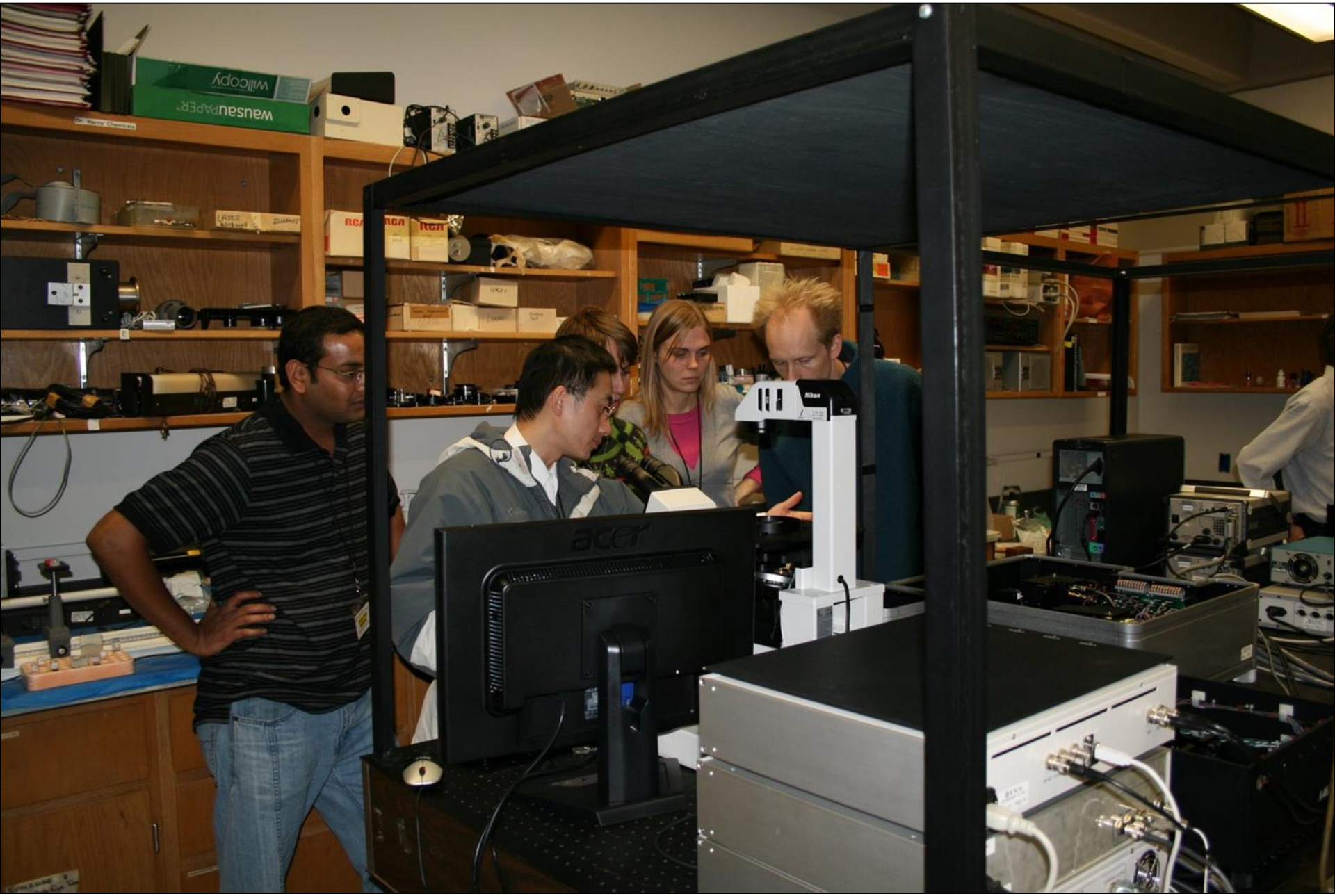
Innovations in Fluorescence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RCA
acer
Nikon


Cotton Tail
Stirling
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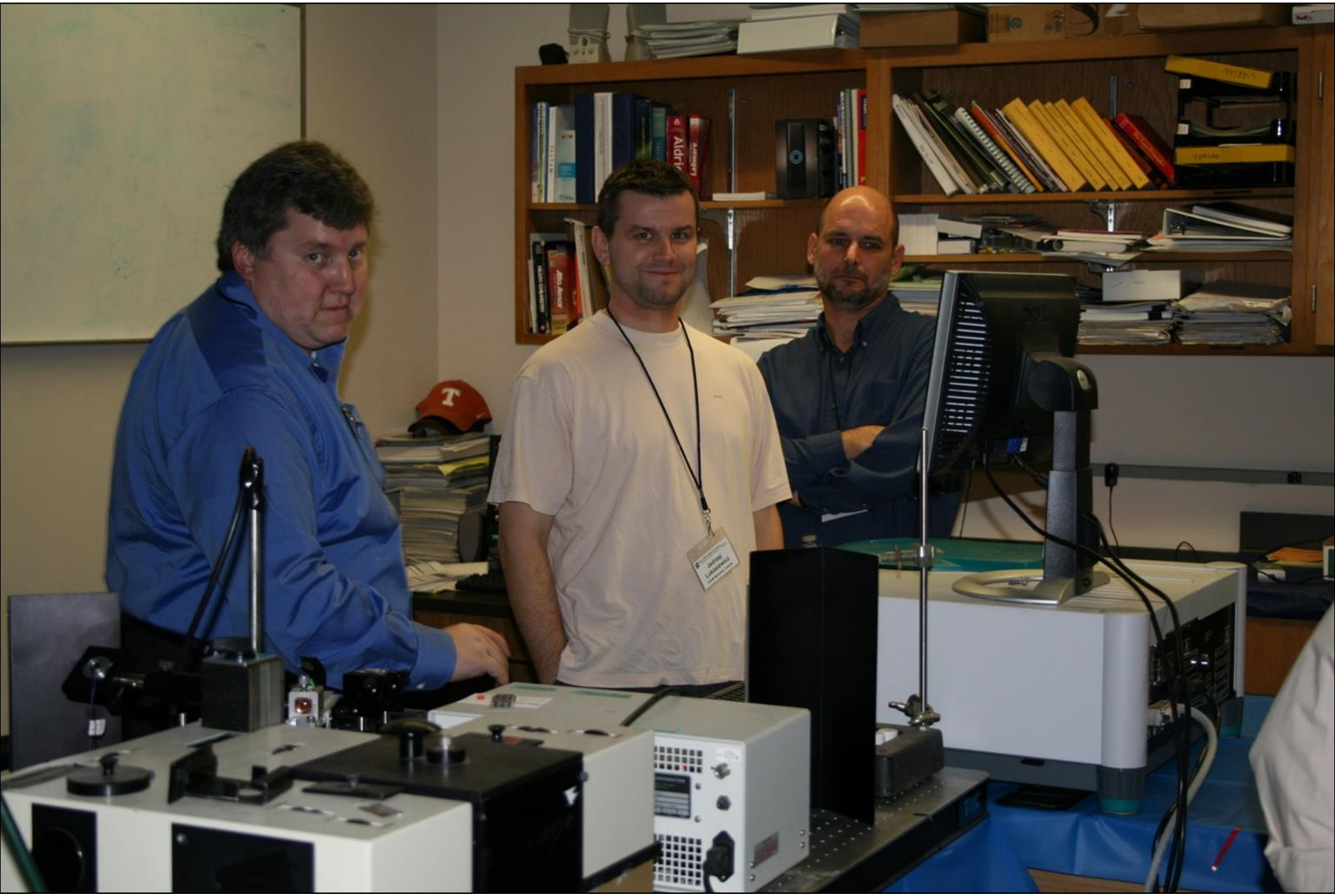

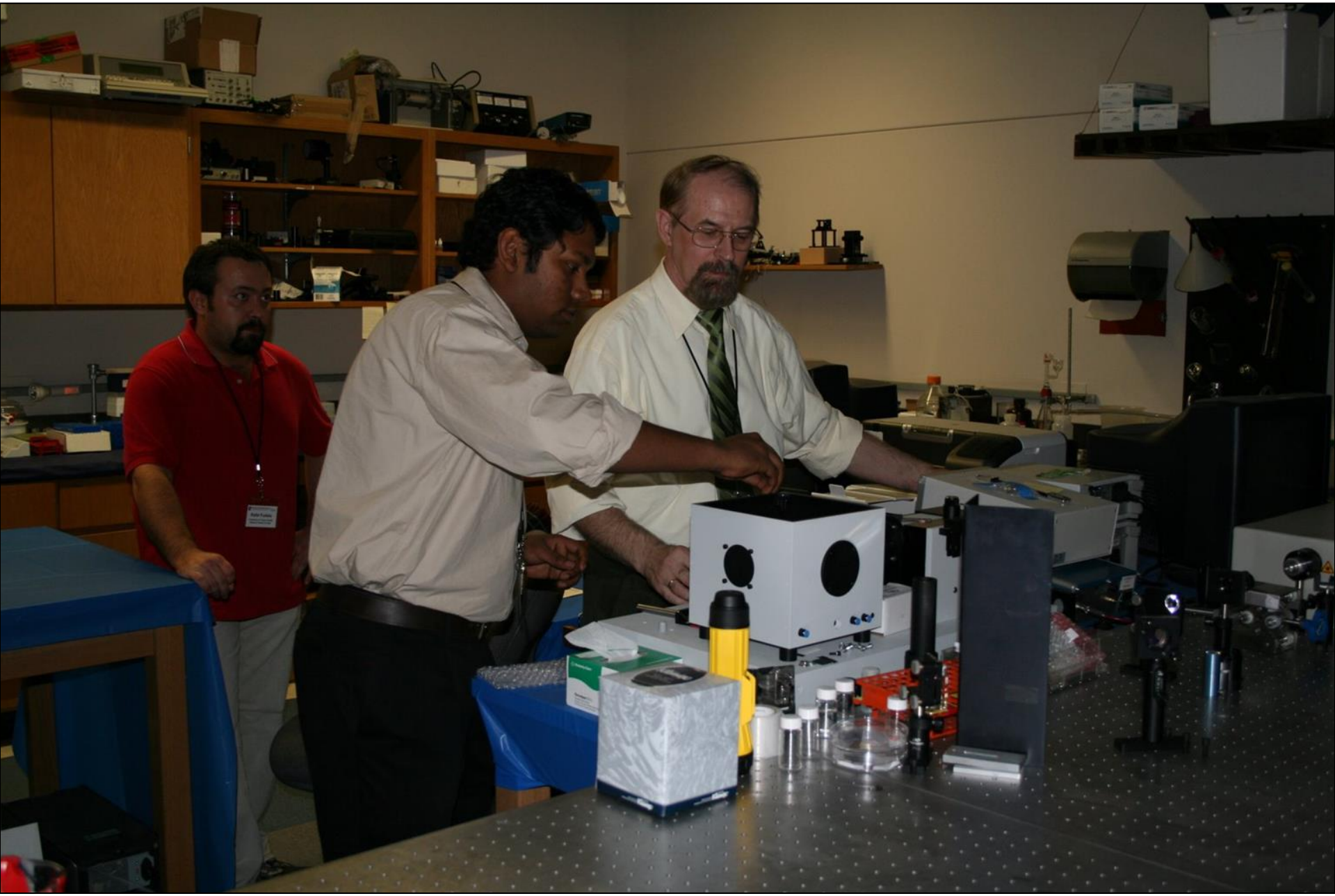


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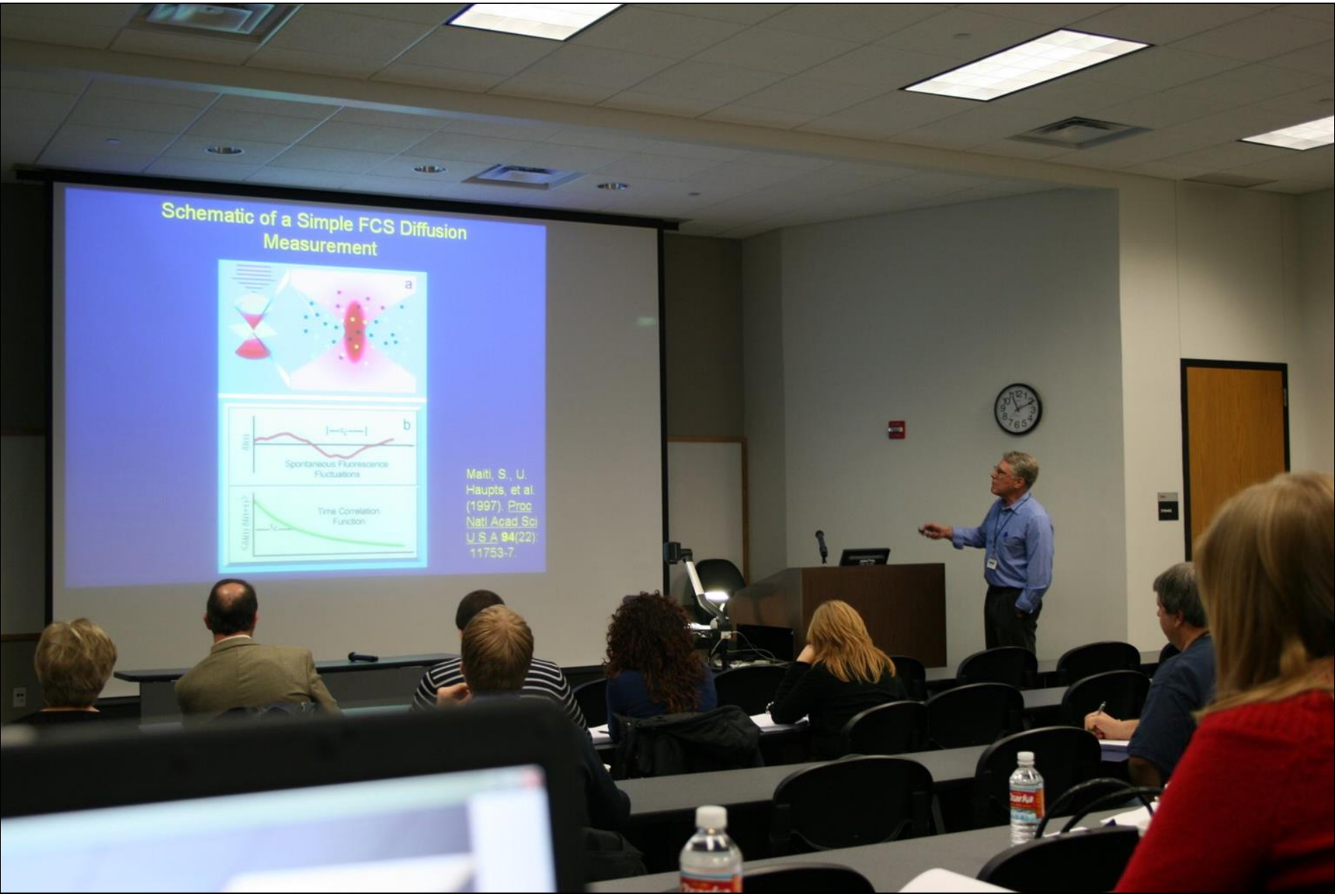
Outline
• Introduction—motivation and concept of FCS
• Measurement of dynamic properties by FCS
• Amplitude methods—PCH and FIDA
• Fluorescence photobleaching recovery and single molecule (particle) measurements
• Applications in solution and in cells
Ozarka


Schematic of a Simple FCS Diffusion Measurement
a
b
Spontaneous Fluorescence Fluctuations
Time Correlation Function
Maiti, S., U. Haupts, et al. (1997). Proc Natl Acad Sci U S A 94(22): 11753-7.


Pepsi


Brightness and number of molecules can be measured independently


deli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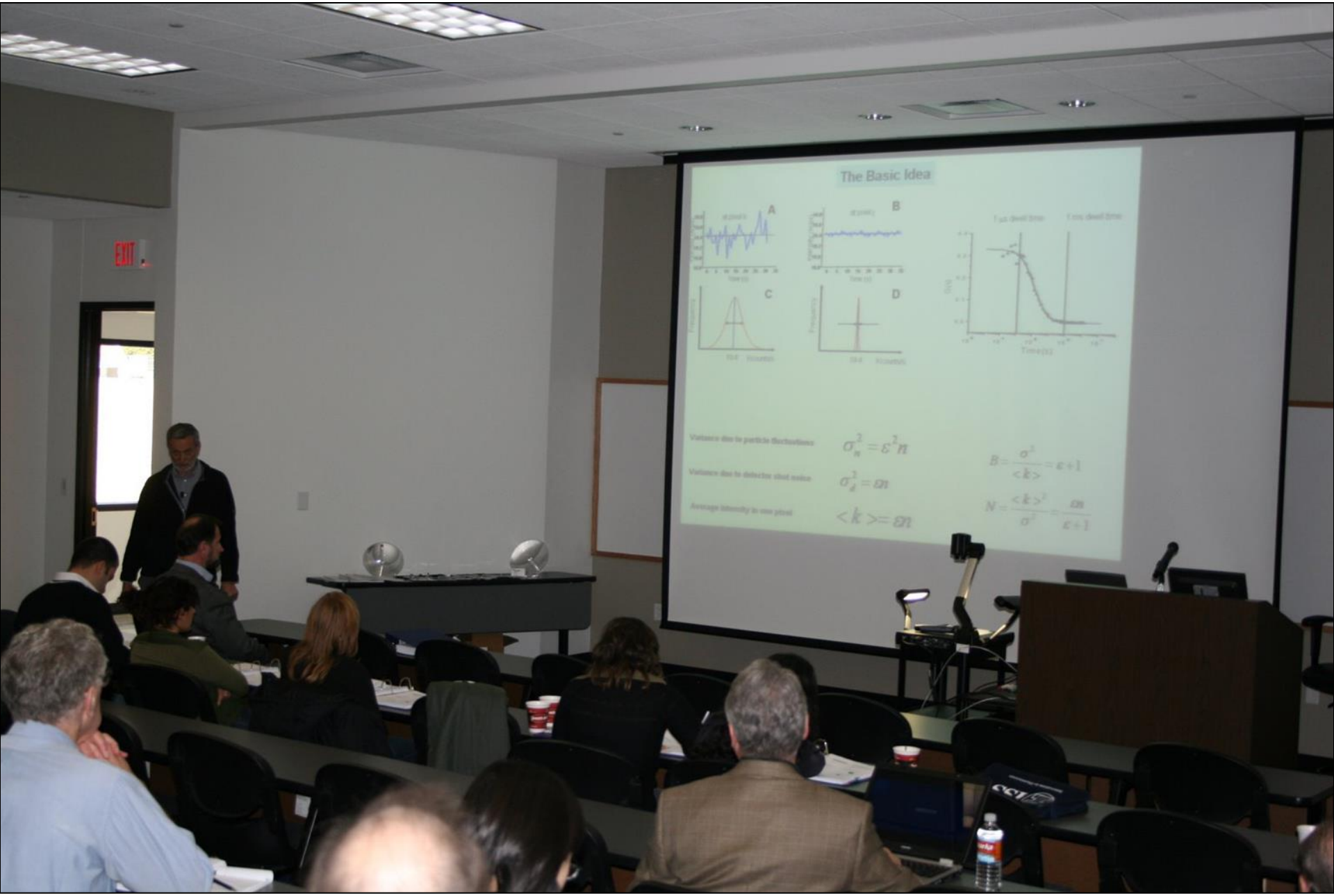
The Basic Idea
A
B
C
D
Variance due to particle fluctuations
$\sigma_n^2 = \varepsilon^2 n$
Variance due to detector shot noise
$\sigma_d^2 = \varepsilon n$
Average intensity in one pixel
$< k >= \varepsilon n$
$B = \frac{\sigma^2}{< k >} = \varepsilon + 1$
$N = \frac{< k >^2}{\sigma^2} = \frac{\varepsilon n}{\varepsilon + 1}$
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CLONTECH


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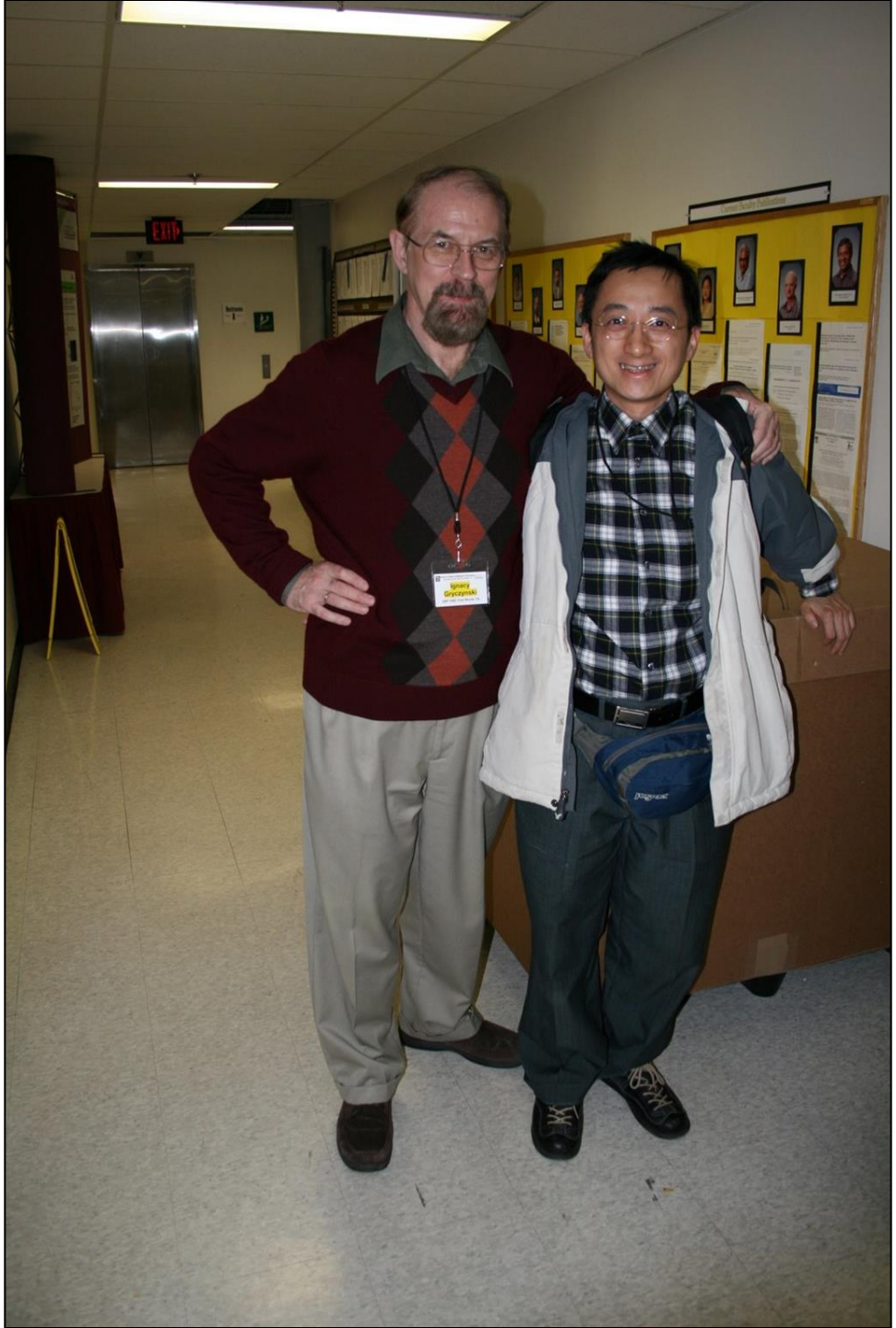
ENERPAC


HOWARD


CAUTION


Old
Trail Town
COWBOYS
KEY


THIS SIDE UP
UNIVERSAL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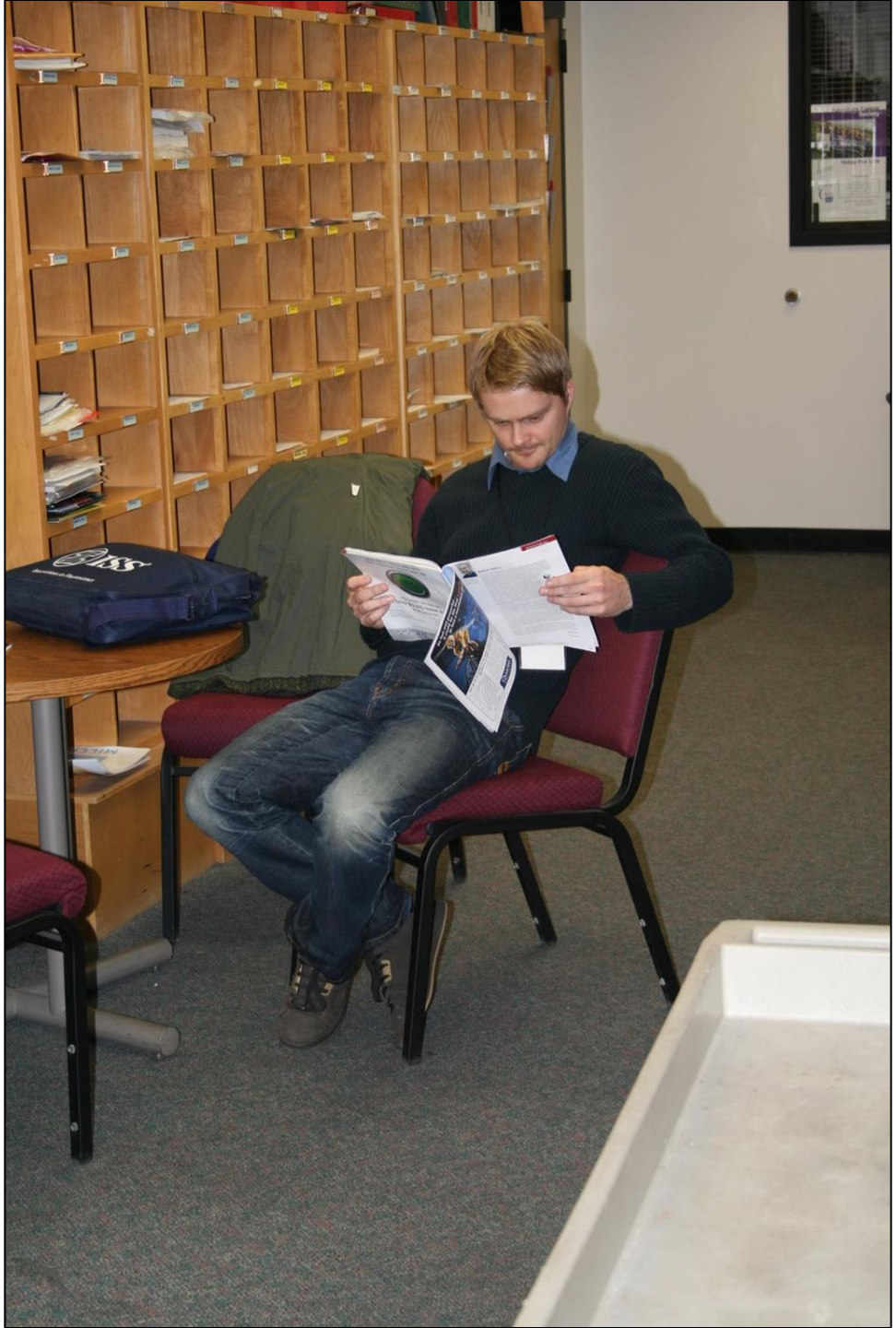
Ignacy
Gryczynski


2-404
Molecular Biology and Immunology
CAUTION


AFM
Atomic Force
Microscopy

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Outline
Analytical ultracentrifugation
Description and applications
Fluorescence detector design
Applications
Normal Use Tracer Sedimentation (NUTS)
Biological On-Line Tracer Sedimentation (BOLTS)


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Coca-Cola
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The University of North Texas
Health Science Center


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Nestlé
Ice Cream Center
PUSH
CRUNCH
DRUMSTICK


EVENT STAFF
ROLLING THUNDER
CYCLES
FRANKLIN AND MARSHALL
PARTS & SERVICE
Antonio Varriale


The University of North Texas
Health Science Center


EVENT STAFF


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SHEET
YEARS


SWEET
YEARS


ISS
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