NANSLO

NORTH AMERICAN NETWORK OF SCIENCE LABS ONLINE

NANSLO Update:

Faculty Professional Development Workshop

MAY 15-16, 2015

SHEPC LEARNING CENTER WICHE, BOULDER, CO

NANSLO Network Lab Activities (6)

BIOLOGY

- Introduction to Microscopy
- Mitosis & Meiosis

CHEMISTRY

- Emission Spectroscopy
- Beer-Lambert Law

PHYSICS

- Accelerated Motion
- Uniform Motion

NANSLO Network Lab Activities (37)

BIOLOGY

- Introduction to Microscopy
- Mitosis & Meiosis
- Buffers
- Diseased Cells
- Membrane Diffusion
- Membrane Osmosis
- Hematology
- Histology – Epithelial
- Histology – Connective
- Histology – Neuronal
- Histology – muscle
- Cell Types – Domains of Life
- Parasitology
- Infectious Prokaryote, Protista, and Fungi
- Photosynthesis
- Enzyme Kinetics

CHEMISTRY

- Acid Base Titration
- Citric Acid in Popular Drinks - Titration
- Emission Spectroscopy
- Beer-Lambert Law
- Beer-Lambert Law of food dye in sports drinks
- Colligative Properties – Freezing Point Depression
- Electron Charge to mass ratio
- Gas Chromatography
- Enzyme Kinetics

PHYSICS

- Accelerated Motion
- Uniform Motion
- Conservation of Momentum
- Electron Charge to mass ratio
- Speed of Light
- Reflection and Diffraction
- Speed of light in a Fiber Optic Cable
- Signal Transmission Through a Coaxial Cable
- Charging and Discharging a capacitor
- LCR Circuits (Resonance)
- Rectification
- The Operational Amplifier
- Buoyancy*
- Rotational Dynamics*

These activities are under development, Underlined labs are used in two disciplines

Chemistry Lab Activities Update

FARNOSH FAMILY

New and Completed Labs

- Beer-Lambert Law of Food dye in sports drinks
- Titration
  - Acid Base
  - Citric Acid
  - Amino Acids (under development)
- Colligative Properties (Freezing Point Depression)
- Avogadro's Number has not been developed

Titrations

- Learning Objectives:
  - Universal:
    - Be able to determine the amount of one substance needed to titrate another and perform appropriate calculations
    - Define titrant and describe the purpose of a titration
    - Perform a standardization of a titrant
  - Acid-Base Specific:
    - Analyze titration data to obtain a titration curve with pH and the volume of titrant added
    - Distinguish between strong acid/base titration and weak acid with strong base titrations
  - Citric Acid
    - Understand the role of citric acid in food products
    - Determine the concentration of an unknown concentration of citric acid using titration.
      - Report the uncertainty (experimental error) in this result
    - Describe the purpose and mechanism of a titration.
    - Describe the interactions of multiple acidic protons in a polyprotic weak acid
    - Explain the conditions at the equivalence point for the titration of citric acid with sodium hydroxide.

Titrations (CONT.)

- Exercises:
  - Acid-Base Specific:
    - Exercise 1: Exploratory Observations
    - Exercise 2: Quantitative Measurements
  - Citric Acid
    - Exercise: Titration of two Drinks

Colligative Properties

Learning Objectives:

- Describe the van't Hoff factor in terms of colligative properties.
- Quantify the freezing point depression for materials with different values of the van't Hoff factor.
- Use temperature data to calculate the concentration of solutes in units of molality, including an estimation of error.

Exercises:

- Exercise: Measuring Freezing Points of Various Solutions

Biology Lab Activities Update

KATE LORMAND

New and Completed Labs

Photosynthesis

- Could also be used for yeast respiration lab

Enzyme Kinetics

- Can also be used in Chemistry

ENZYMES

- Learning Objectives:
  - Define enzymes, know their functions and their characteristics.
  - Understand how enzyme activity can be affected by certain variables.
  - Observe and explain enzyme activity by means of a colorimetric enzyme reaction.
  - Use quantitative data to create a graph.
  - Determine the effect of temperature on enzymatic activity.
  - Determine the effect of substrate concentration on enzymatic activity.
- Exercises:
  - Exercise 1: The Effect of substrate concentration on Enzyme activity.
  - Exercise 2: The Effect of Temperature on Enzyme activity.

PHOTOSYNTHESIS

- Learning Objectives:
  - State the photosynthetic equation and determine what two things you could measure to determine the rate of photosynthesis?
  - Design and conduct a simple experiment to show the evolution of oxygen gas as a product of photosynthesis.
  - Describe how altering a variable such as light intensity or wavelength will impact photosynthesis.
  - Determine which wavelengths of light have high energy and which have lower energy levels.
  - Collect quantitative data on the rate of photosynthesis at different wavelengths of light.
  - Graph the data collected and interpret the data.
  - Explain why the rate of photosynthesis varies under different environmental conditions.
  - Use an O2 Gas Sensor to measure the amount of oxygen gas consumed or produced by a plant during respiration and photosynthesis.
  - Use a CO2 Gas Sensor to measure the amount of carbon dioxide consumed or produced by a plant during respiration and photosynthesis.
- Exercises:
  - Off-Line Exercise: Measuring Oxygen Levels as A Function Of Photosynthetic Rates – Qualitative Procedure.
  - On-Line Exercise: Measuring Oxygen Levels as A Function Of Photosynthetic Rates – Quantitative Procedure.

Allied Health Lab Activities Completed

FARAH BENNANI

New and Completed Labs

Buffers

Buffers Lab

- Learning Objectives:
  - Define buffer, acid and base.
  - Define pH and describe the principle involved in the measurement of pH
  - Explain the effect of a buffer on the pH of a liquid.
  - Collect and analyze data using a drop counter and digital pH probe
  - Interpreting the data on a graph to determine the point at which buffer stabilization fails.
- Exercises:
  - Exercise 1: Adding an Acid to Buffer Solutions
  - Exercise 2: Adding a Base to Buffer Solutions

Colorado Community College System NANSLO Lab

PJ BENNETT

The Denver NANSLO Lab Has Served About 2700 Unique Students

	2012		2013			2014			2015			
	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU[#]	FA	Total[#]
Biology	53	99	144	NA[+]	NA[+]	289	141	375	244	140		1485
Chemistry	55	23	54	NA[+]	NA[+]	87	72	108	72	85		556
Physics	32	54	31	NA[+]	NA[+]	182	66	160	72	70		667

<u>This works out to about 5700 student labs.</u>

NA[+] The Denver NANSLO lab was closed for upgrades and relocation.

[#] These are predicted numbers from CCC Online.

We have served 5 Institutions

- Colorado Community College Online
- Pueblo Community College
- Laramie County Community College
- Lake Area Technical Institute
- (early in the grant) Great Falls Mountain State University

We have delivered 15 of the 27 labs

- Introduction to Microscopy
- Mitosis and Meiosis
- Cell Types
- Membrane Osmosis
- Membrane Diffusion
- Photosynthesis
- Enzymes
- Beer's Law
- Beer's Law with Sports drinks.
- Emission Spectroscopy
- Acetic Acid Titration
- Electron Charge to Mass Ratio
- Accelerated Motion
- Uniform Motion
- Conservation of Momentum

Great Falls Montana State University NANSLO Lab

BRENDA CANINE

GFC MSU NANSLO Lab opened Fall 2015

Introduction to Microscopy

Mitosis and Meiosis

Histology

Cell Types

Membrane Diffusion

Hematology

Parasitology

Beer's Law

Emission Spectroscopy

505 lab activities delivered to date

GREAT FALLS COLLEGE
MONTANA STATE UNIVERSITY

Spring 2015 Student Usage

Introduction to Microscopy- 17

Mitosis and Meiosis-3

Histology -12

Membrane Diffusion-3

Cell Types- 3

Hematology-24

Parisitology-17

Beer's Law- 7

Emission Spectroscopy- 63

North Island College
NANSLO Lab

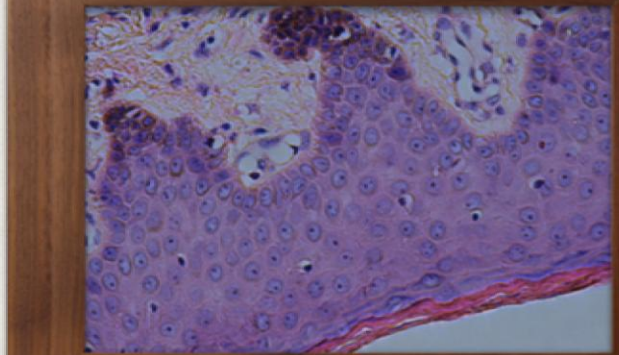
ALBERT BALBON

North American Science Labs Online (NANSLO)

NORTH ISLAND COLLEGE

Remote Web-based Science Laboratory

NORTH ISLAND COLLEGE



Albert Balbon
Architect, Remote Web-based Science Laboratory
North Island College

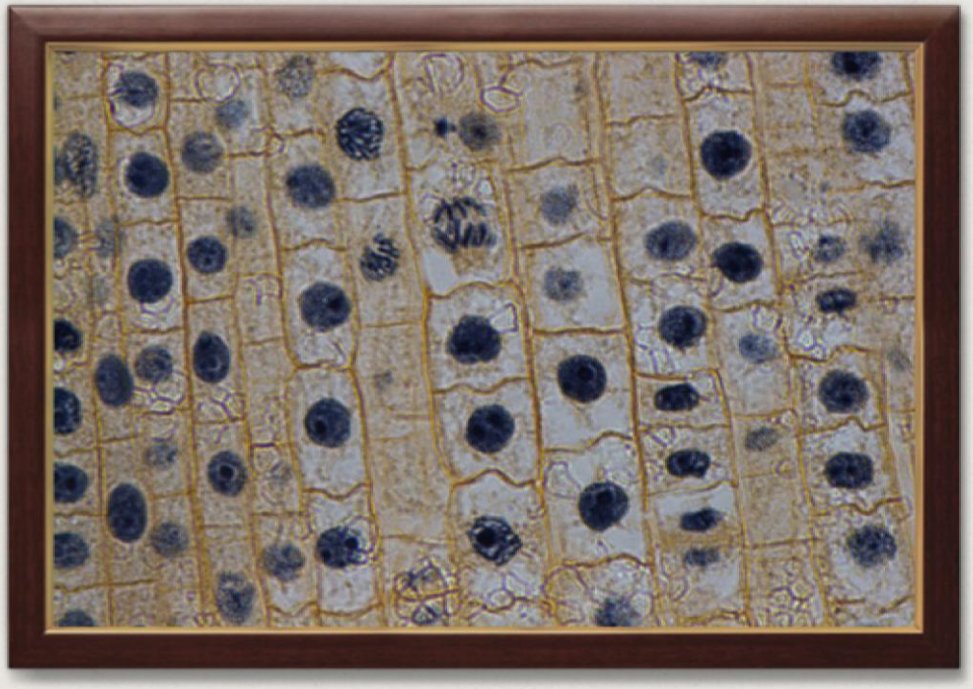
Kodiak College, Alaska

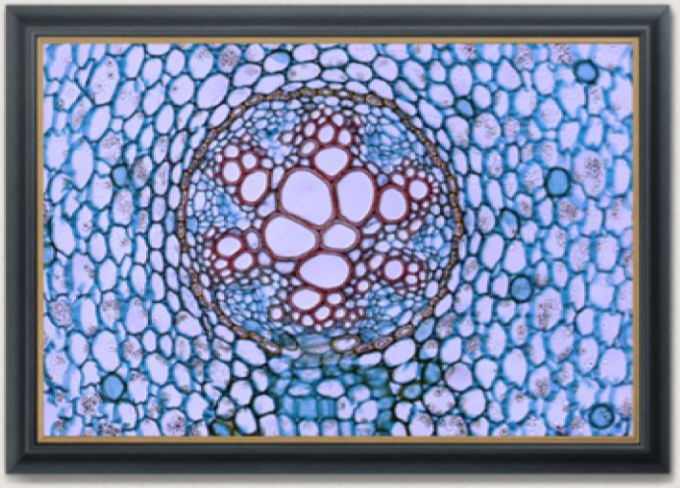
Kodiak College, Alaska

Introduction to Microscopy

Dr. Suzanne Buie

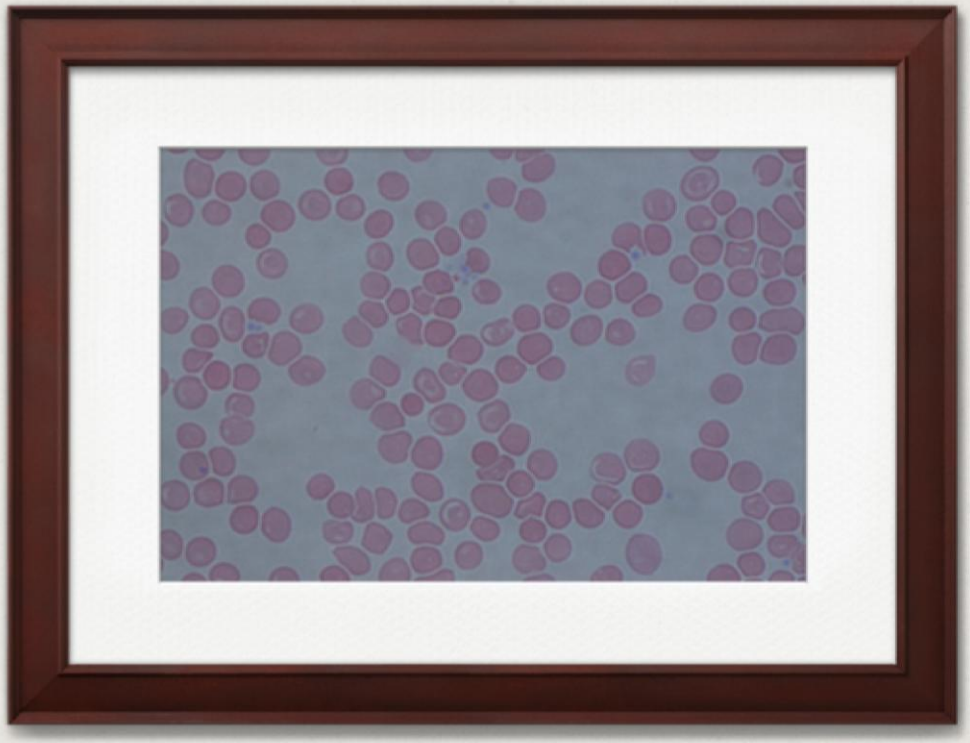
Mitosis and Meiosis

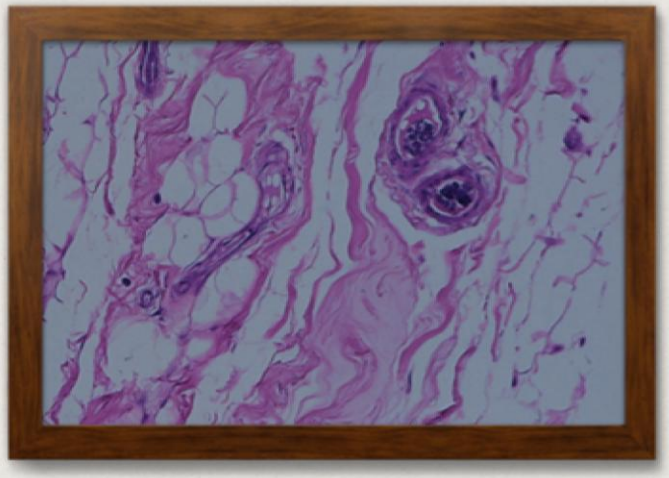




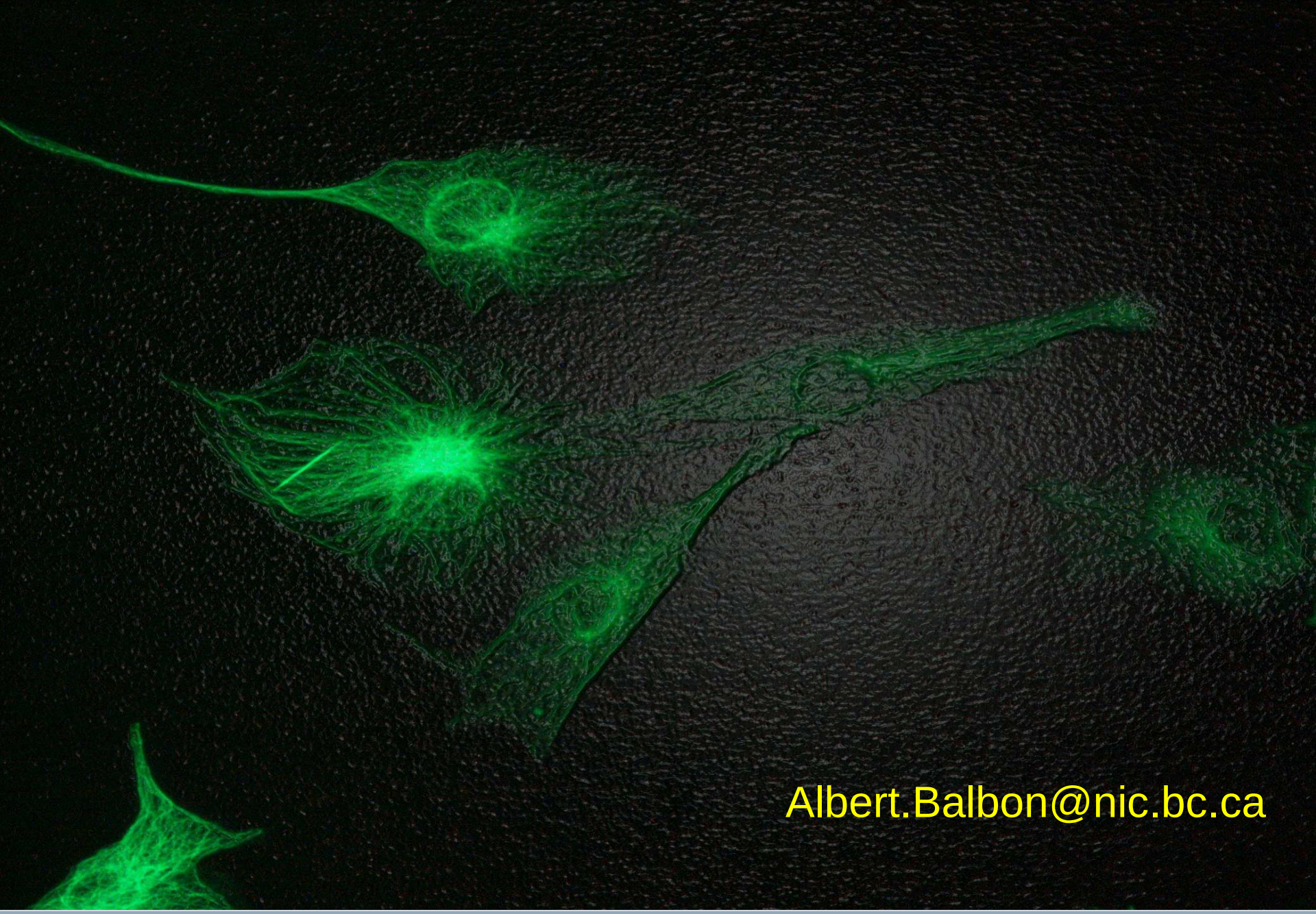
Dr. Suzanne Buie

Essentials of Human Disease





Dr. Chris Hurley



Albert.Balbon@nic.bc.ca

Scheduler:

Western Interstate Commission on Higher Education

SUE SCHMIDT

Scheduling a Reservation Using the NANSLO Network Scheduling System

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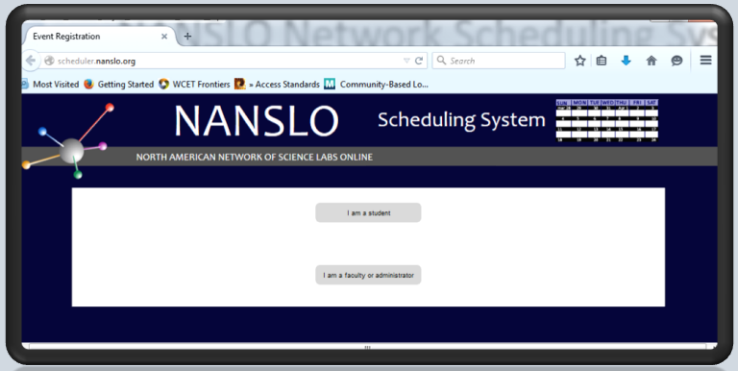
Accessing NANSLO Using the NANSLO Network Scheduling System

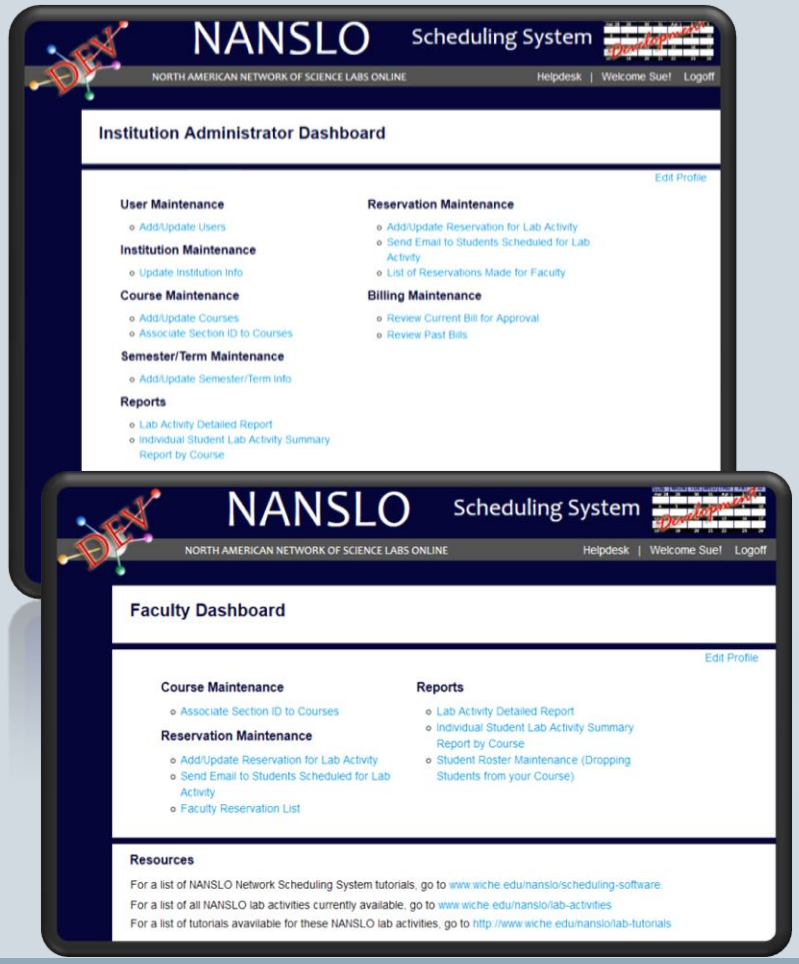


Log-in Screen to Access Dashboard

scheduler.nanslo.org

- Reviews parameters for reservation – NANSLO lab activity, date, number of students, and team size.
- Defines number of sessions needed for reservation and displays laboratory availability.
- Books block of time selected (reservation) for affiliated institutions and faculty and assigns reservations to appropriate NANSLO laboratory.
- Generates unique URL and PIN for each reservation.
- Associates each reservation to a course, section ID, and faculty.
- Records student appointment selection (date/time chosen to perform lab activity within reservation block.)
- Provides custom dashboards with capabilities based on role (Institutions, Faculty, and Students.)
- Provides student activity reports for faculty and institutions.
- Provides financial transaction capabilities for billing NANSLO services.

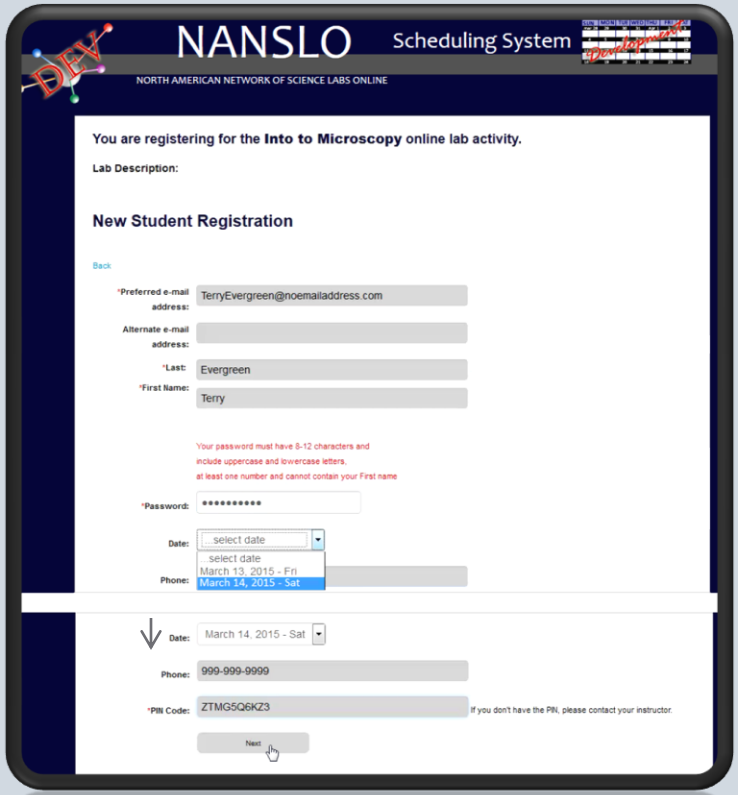
What is the Reservation Process for Faculty?



- Select a NANSLO lab activity
- Select a course/section
- Enter the number of students to be served and team size
- Select a date range
- Select number of sessions needed (students/team size)
- Give the unique URL and PIN number generated to students

Sample Institution and Faculty Dashboards

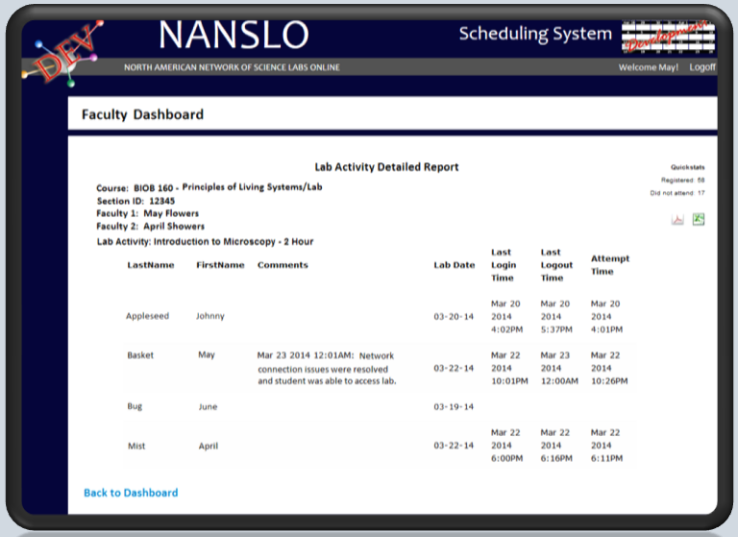
How do students access these labs?



Creating a NANSLO Network Scheduling System Account and Setting Up An Appointment

- Using the URL and PIN provided, sets up a scheduling system account and selects an appointment date and time.
- On the date and time selected, uses the URL or Student Dashboard to access the NANSLO control panel for that assigned lab activity.
- Uses instructions on the NANSLO control panel to . . .
  - Dial in to a teleconference line allowing team members to interact with one another.
  - Talk to Lab Technicians that can assist in resolving technical issues and answer “how to” equipment questions.

Students Reports for Faculty

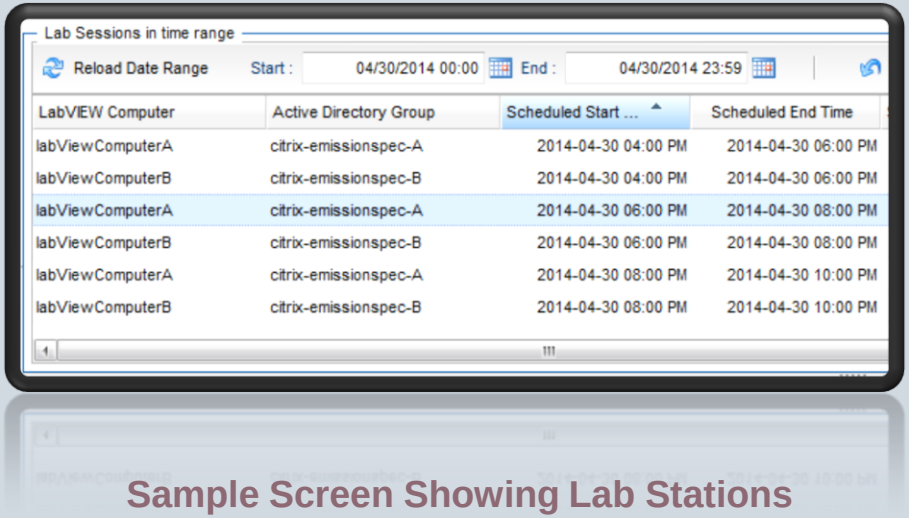


Sample of Student Detailed Report for Lab Activity

Reports provide information on:

- Who made an appointment for an assigned lab.
- Who made an appointment and didn't show up for the lab.
- Who attempted to access the lab on the selected date and time and were unable to log into the lab station computer.
- What time a student logged in and logged out allowing faculty to determine time spent in the laboratory.
- Review notes appended to individual student records by Lab Technicians.

NANSLO Laboratory Scheduling System



Sample Screen Showing Lab Stations

Integrated with the NANSLO Network Scheduling System, this system

- Reserves the block of time (reservation).
- Authenticates students on their selected appointment date and time.
- Presents the appropriate NANSLO Remote Web-based Science Lab (RWSL) control panel.
- Places students on a specific lab station computer.
- Provides an input area for lab technicians to append comments to individual records or to all student records on a team.
- Captures attempted, logged in and logged out times and sends to NANSLO Network Scheduling System for reporting purposes.
- Provides other tools used at the laboratory level for delivering NANSLO services.

Thank you

Q & A