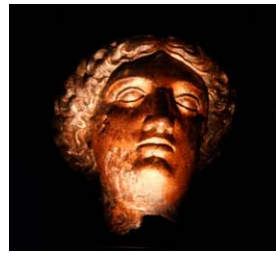# MINERvA Overview and Experiment Management
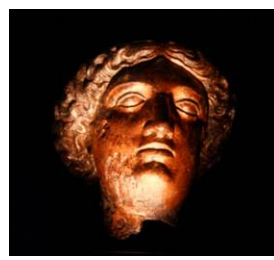
Deborah Harris
Kevin McFarland
Fermilab
17 October 2016

Outline

- MINERvA Overview
  - Physics goals in 1 slide
  - Brief History of MINERvA

- Experimental Management
  - Roles of the collaboration
  - Roles of the laboratory

- Introduction to the Review

MINERvA's Physics in One Slide

- MINERvA is studying neutrino interactions in unprecedented detail on nuclei – He, C, CH_2, H_2O, Fe, Pb
  - Unique information about nuclear effects
  - Measured in exclusive final states
    - As function of a measured neutrino energy
    - Study differences between ν and anti-ν
- Low Energy (LE) Beam Goals:
  - Exclusive signal and background reactions relevant to oscillation experiments
- Medium Energy (ME) Beam Goals:
  - Structure Functions on nuclei (e.g., EMC effect, shadowing)
  - Exclusive reactions with expanded kinematics
  - First high statistics on nuclear targets, anti-neutrinos
- Collaborations with generator, flux and oscillation communities
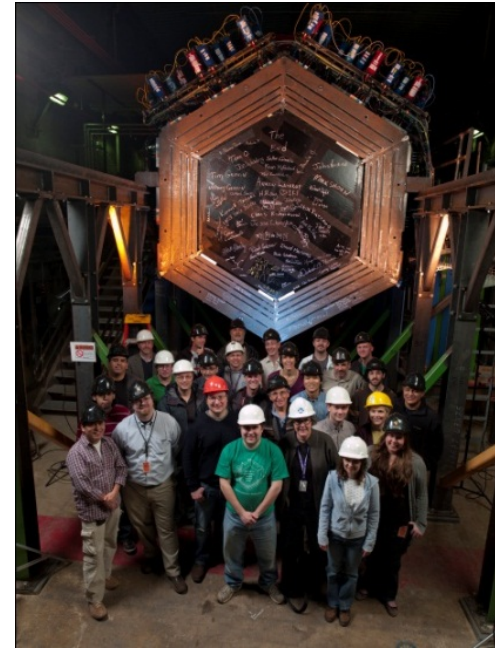
Brief History of MINERvA
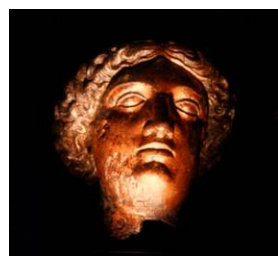
- **Project Era**
  - CD-0 in 2006
  - CD-1,2,3a in 2007
  - CD-4 in 2010

- **Experiment**
  - Started running with partial detector in 2009
  - Started running with full detector in March 2010
  - Low Energy Data: 2009-2012
  - Start of MINOS ND shift checklists on shift: 9/9/2011
  - First Physics Publications from LE data: 2013
  - Medium Energy Data: start in 2013
  - New Flux Prediction Infrastructure Released: 12/2015
  - Neutrino Intraction Publications so far:
    8 PRL's, 7 PRD's, 1 PRC
  - NIM Publications so far: 4

MINERvA Collaboration
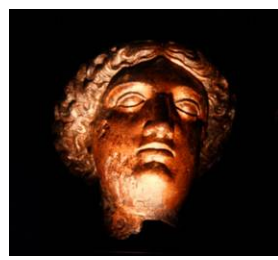
- Centro Brasileiro de Pesquisas Fisicas
- Fermilab
- University of Florida
- Universite de Geneve
- Universidad de Guanajuato
- Massachusetts College of Liberal Arts
- University of Minnesota at Duluth
- Universidad Nacional de Ingenieria
- Oregon State University
- Otterbein University
- Oxford University
- Potificia Universidad Catolica del Peru
- University of Mississippi
- University of Pennsylvania
- University of Pittsburgh
- University of Rochester
- Rutgers, The State University of New Jersey
- Universidad Tecnica Federico Santa Maria
- Tufts University
- College of William and Mary

Institutions in
Blue:
Participated in
Detector
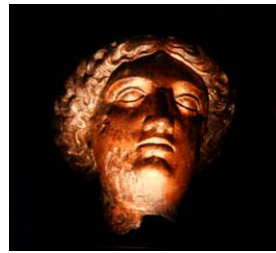Construction

MINERvA Collaboration

- Centro Brasileiro de Pesquisas Fisicas
- Fermilab
- University of Florida
- Universite de Geneve
- Universidad de Guanajuato
- Massachusetts College of Liberal Arts
- University of Minnesota at Duluth
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- Tufts University
- College of William and Mary

Institutions in
Blue:
International
Institutions

MINERvA Demographics
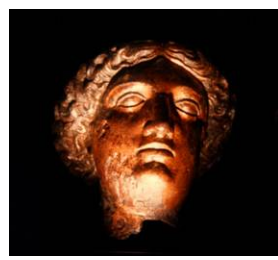
Names	Total	Domestic	DOE Univ	FNAL	Intn'l
Masters Student	2	0	0	0	2
PhD Student	19	12	10	0	7
Postdoc	9	7	4	2	2
Faculty	24	15	9	1	9
Scientist	8	6	1	5	2
Total	**62**	**40**	**24**	**8**	**22**

Snapshot as of February 2016
Collaboration is 1/3 International at most levels
First authors on publications are also 1/3 international

MINERvA Demographics
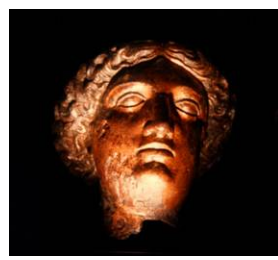
FTE Weighted	Total	Domestic	DOE Univ	FNAL	Intn'l
Masters Student	1.3	0.0	0.0	0.0	1.3
PhD Student	16.7	11.4	9.9	0.0	5.3
Postdoc	6.6	5.8	3.5	1.5	0.8
Faculty	11.4	8.2	4.9	0.2	3.2
Scientist	6.1	4.4	1.0	3.4	1.7
Total	**42.1**	**29.8**	**19.3**	**5.0**	**12.3**

Snapshot as of February 2016
Collaboration is 1/3 International at most levels
First authors on publications are also 1/3 international

Questions from the Charge

1. Is there an Experiment Operations Plan (EOP) document that has been updated to include the additional scope from the MINOS ND?

   The document should include:

(a) A description of operations tasks coverage,   (Nur for MINERvA, Leo for MINOS)

(b) ES&H activities and how they will be managed, (Nur)

(c) Organization charts showing the management structure and lab interfaces (Spokes)

(d) The model for data processing and analysis (Dan)

(e) A list of the identified resources available (Phil, Nur, Leo, Dan)

(f) A description of the roles and responsibilities within the collaboration. (Spokes)

2. Are the MINOS ND performance and calibration requirements (Leo)

3. Is there a well-understood run plan for FY17, consistent with AD plans? (Phil)

3a. Have adequate resources from the laboratory and the collaboration been identified (Spokes)

4. Are there robust plans for data processing and data analysis? (Dan)

5. Are there clear goals set for reporting and publishing the results?   (Phil)

EOP Process

- Original Documentation:
  - Technical Scope of Work, last updated 9/6/2013
  - Computing Division TSW produced more recently
- Current EOP:
  - Started with MicroBooNE EOP for guidance
  - Also borrowed heavily from MINOS MOU for additional input
  - Now has direct input from SCD, collaborators, and head of ND Detector Operations Support Group

Interfaces with Laboratory

Sergei Nagaisev (head)

Spokespersons
Deborah Harris
Kevin McFarland

Main Control Room

Safety Coordinator
Dee Hahn

Scientific Computing Division
Pangagiotis Spentzouris (head)
Gabriel Perdue (Liaison)

Experimental Liaison
Steve Hahn

Run coordination
Howard Budd

Underground Areas
Steve Hahn

Detector Expert Coordination
Nuruzzaman

MINOS Detector Experts
Donatella Torretta
Steve Hahn
Bill Badgett

Neutrino Division
Steve Brice (head)

Particle Physics Division
Patricia McBride(head)

MINERvA Detector Experts
Mateus Carneiro
Rob Fine
Alejandro Ramirez
Marianette Wospakrik

Rock Muon Monitoring
Roger Galindo

Online Monitoring
Ozgur Altinok
Barbara Yaeggy

University Remote Operations Coordination
Ozgur Altonok
Nuruzzaman

Charge question 1c,
Page 10 of EOP
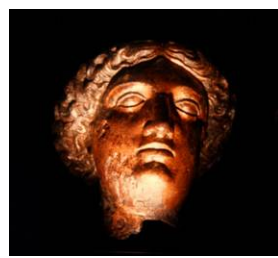
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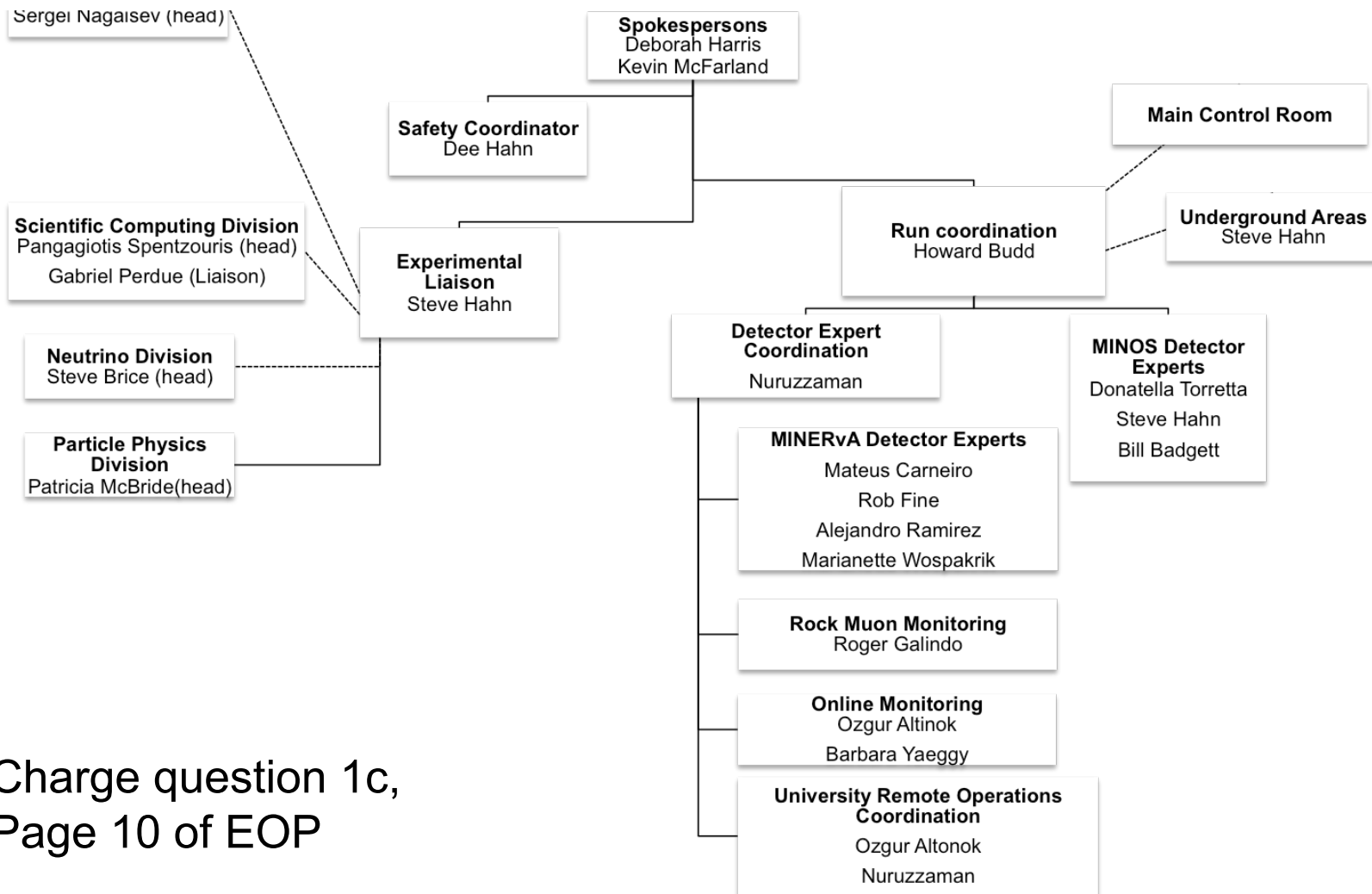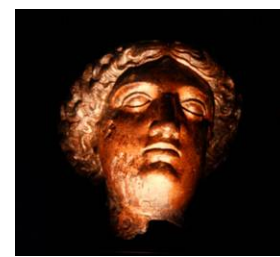
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Collaboration Management

Institutional Board
Jeff Nelson (chair)

Speakers Committee
Vittorio Paolone (chair)

Spokespeople
Deborah Harris

Kevin McFarland

Executive Committee
Rik Gran (chair)

Computing Infrastructure
Daniel Ruterbories

Physics analysis coordinator
Philip Rodrigues

MINERvA Detector Operations
Howard Budd
Nuruzzaman
Rob Fine

Software releases
Trung Le

Production
Dipak Rimal

Event Generators
Tomasz Golan

Hugh Gallagher

Gabriel Perdue

Reconstruction/ Algorithms
Trung Le

Calibration/Testbeam
Leo Bellantoni

Emily Maher

Most have roles in 2 groups: Ops/Calibration/Infrastructure plus analysis

Groups not shown: CCQE, pion production, Inclusives/DIS, Flux

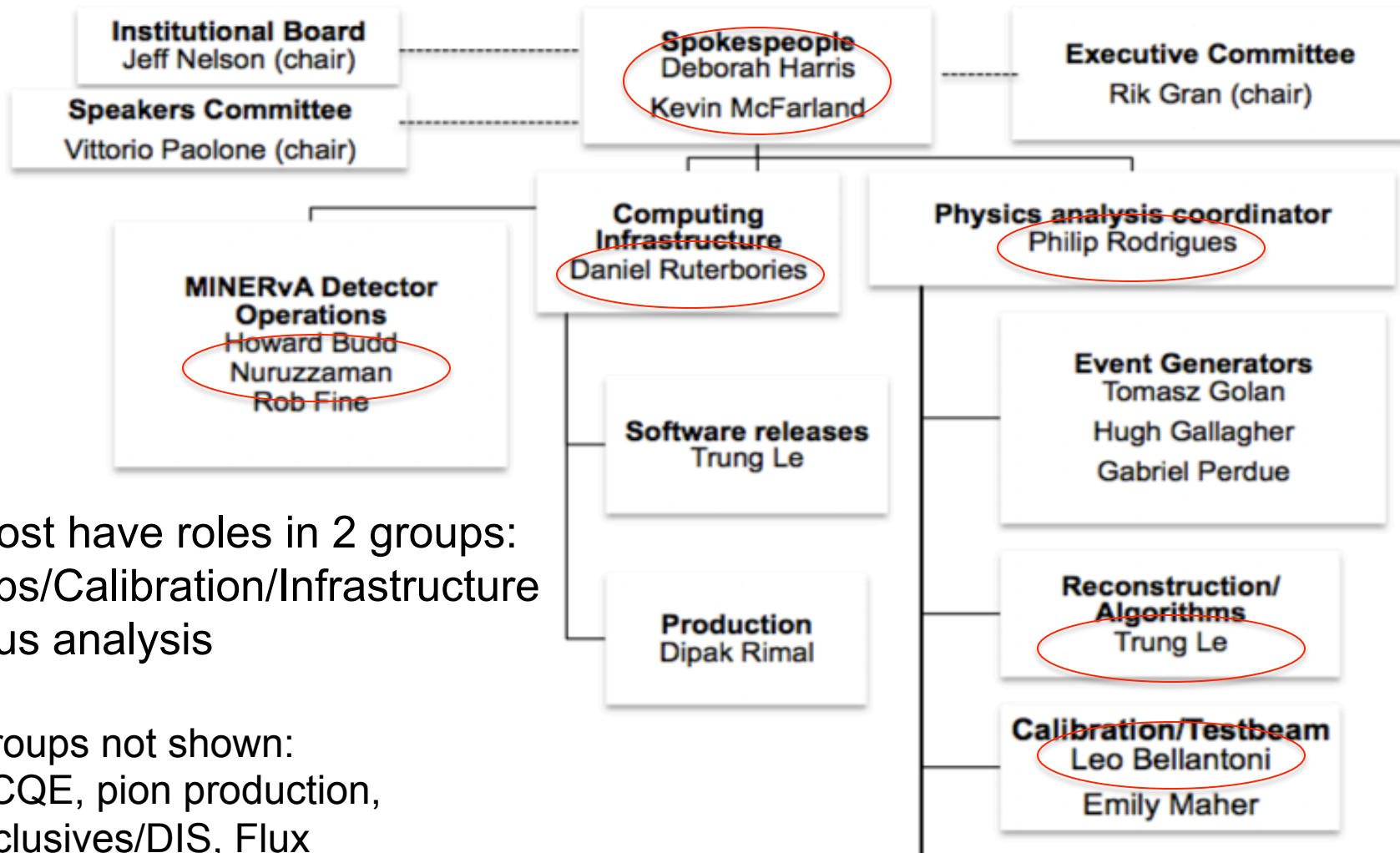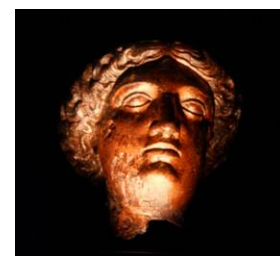# Questions from the Charge

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Remaining Talks Today

- P. Rodrigues: MINERvA Results, Prospects and Collaboration
- Nuruzzaman: MINERvA Detector Status, Operations, Experience and Plans
- L. Bellantoni: MINOS Detector Operations
- D. Harris: Detector Performance History & Needs for Physics Analyses
- D. Ruterbories: Computing and Common Processing
- T. Le: User Analysis Computing
- D. Harris: Resource Summary

Updated ND Org Chart

Effective: Oct 15, 2016

Admin Support
- M. Dixon
- M. Hronek
- E. Johnson
- J. Saviano
- S. Schuler

Neutrino Division Office
S. Brice, Head
S. Zeller, Deputy Head
R. Rameika, Assoc. Head for ProtoDUNE
P. Wilson, Assoc. Head for SBN
M. Anderson, FFM
(D. Randich, WDRS)
(A. Aparicio, DSO)
(S. Schuler, Admin. Supt.)

GSR
- D. Bogert
- D. Jensen
- H. Jostlein
- W. Smart
- R. Stefanski

Technical Support Department
B. Norris, Head
(M. Dixon, Admin Support.)

LAr Detector Engineering Group
(B. Norris, Ldr.)
- M. Delaney
- M. Dinnon
- R. Doubnik
- M. Geynisman
- M.J. Kim
- F. Schwartz
- A. Soha
- A. Stefanik
- J. Tillman
- M. Zuckerbrot

Operations Support Group
M. Stancari, Ldr.
- W. Badgett
- L. Bagby
- H. Ferguson
- S. Hahn
- B. Johnson
- C. McGivern
- D. Torretta

DUNE Department
(R. Rameika Head)
(M. Hronek, Admin Support)
(M. Dixon, Admin Support)

DUNE Management
E. James, Ldr.
J. Macier

DUNE Science
B. Rebel, Ldr.
(S. Brice)
C. Escobar, GS
(A. Himmel, WF)
T. Junk
P. Lebrun
A. Marchionni
J. Raaf
T. Yang

ProtoDUNE
F. Cavanna, Ldr.
R. Acciarri
B. Baller
A. Hahn
S. Lockwitz
(J. Paley)
(R. Plunkett)
S. Pordes
(R. Rameika)
G. Savage
(M. Toups)

SBN Department
(P. Wilson, Head)

SBN Project
(P. Wilson, Ldr.)
(E. Johnson, Admin. Supt.)
C. James
R. Krull, C
T. Miao

SBN Science
O. Palamara, Ldr.
(J. Saviano, Admin. Supt.)
R. Castillo-Fernandez, RA
A. Fava, WF
H. Greenlee
B. Lundberg
Z. Pavlovic
A. Schukraft
(M. Stancari)
M. Toups
(S. Zeller)

NuMI Department
R. Plunkett, Head

MINERvA
D. Harris, Ldr.
(J. Saviano, Admin. Supt.)
L. Bellantoni
M. Betancourt, RA
M. Kiveni, RA
J. Morfin

NOvA
P. Shanahan, Ldr.
(E. Johnson, Admin. Supt.)
G. Brunetti, RA
J. Cooper
A. Himmel, WF
K. Matera, RA
E. Niner, RA
J. Paley
K. Sachdev, RA, LF
L. Suter, WF
R. Tesarek