

# LBNE COLLABORATION ORGANIZATION DOCUMENT

## Fermilab Long-Baseline Neutrino Experiment

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## 2. Working Groups, Committees & Boards

This section describes the standing working groups, committees, boards and coordinators of the collaboration. Their roles and responsibilities and relationships to each other and the project management are briefly described.

Conveners and coordinators are appointed by the LBNE co-spokespersons in consultation with the Executive Committee. The appointment term for each collaboration appointed position is 1 year renewable from the date of the appointment unless otherwise stated in the charge.

### A. Physics Analysis Group

**Charge of the Convener:** *The Physics Analysis Group Convener (PAGC) is responsible for the production of all scientific results from the collaboration. The PAGC is responsible for establishing physics analysis subgroups and appointing (co-)conveners of the subgroups in consultation with the co-spokespersons and the Physics Tools Group Coordinator. The PAGC may establish procedures to review the results (scientific papers, plots, tables, statistical sensitivity, measurements, and limits on scientific parameters, etc.) before they can be released in public.*

Current working subgroups:

- Long-Baseline Neutrinos
- Atmospheric Neutrinos
- Proton Decay
- Galactic SN Burst
- Diffuse Supernova
- Other (including Solar, Reactor and Geo-neutrinos)
- Short-Baseline/Near Detector Physics

**Charge of the Near Detector Physics Convener:** *The Near Detector Physics Group (NDPG) is a subgroup of the LBNE physics analysis group. The NDPG convener(s) will be appointed by PAGC in consultation with the co-spokespersons. This working group is responsible for all aspects of the near detector physics: those directly related to the long-baseline physics and the precision neutrino interaction physics. It should function in a coordinated manner with the Long-Baseline Physics Working subgroup as well as the Near Detector and the Beam subprojects.*

### B. Physics Tools Group

**Charge of the Convener:** *The Physics Tools Group Coordinator (PTGC) is responsible for the production and verification of all analysis tools for the collaboration. The PTGC is responsible for establishing tools subgroups and appointing (co-)conveners of the subgroups in consultation with the co-spokespersons, the Physics Analysis Group Convener and the Software and Computing Coordinator. These tools include, but are not limited to, detector and beam simulation and analysis methods, reconstruction methods, methods for track and vertex recognition, kinematic resolution, particle identification techniques, methods for extrapolation of measurements from the near detector, statistical methods. The PAGC may appoint ad hoc internal sub-committees to review the proposed techniques before they are approved for final physics analysis.*

Current working subgroups:

Electron and Photon Production and Transport  
Far Detector Simulation  
Event Reconstruction (Near and Far)  
Cross Sections and Nuclear Models  
Cosmic Rays and Cosmogenics  
Near Detector Simulation  
Beam Systematics  
Radiological and Cleanliness Models

## C. Speakers Committee

### **Charge of the Speaker's Committee: CHARGE**

*The Purpose of the LBNE speakers' committee is to choose speakers for conferences and workshops, and talks at National or International Laboratories. Where possible and appropriate, it should solicit and promote LBNE talks. The committee consists of a chairperson, a secretary, and other members appointed by the LBNE spokespersons. The committee will consult with the spokespersons as needed. For the purposes of this committee, any talk whose content is primarily about the LBNE experiment is considered an LBNE talk.*

*The chair of the Speakers Committee will prepare a recommendation to the Institutional Board for procedures for quality control of talks and papers by July 2014.*

*The Speakers Committee will seek recommendations from institutional board members and relevant conveners. The Speakers Committee will be appointed by the co-Spokespersons in consultation with the Executive Committee. The chair of the Speakers Committee will have overall responsibility for carrying out the responsibilities of the Committee.*

## D. Collaboration Technical Coordinators Group

Collaboration Technical Coordinators Group is convened by co-spokespersons and consists of the following coordinators:

- i. Collaboration Technical Coordinator
- ii. Collaboration R&D Coordinator(s)
- iii. Collaboration Conventional Facilities Coordinator
- iv. Collaboration Beam Coordinator
- v. Collaboration 35-ton prototype Coordinator(s)

### **i. Collaboration Technical Coordinator**

The spokespersons will appoint a Collaboration Technical Coordinator (CTC) who will lead a collaboration technical coordination team to serve as liaisons between the science collaboration and the construction project. The appointments for the CTC and the coordination team will be made in consultation with the collaboration executive board and the Project Director.

**Charge to the CTC:** *The CTC shall maintain a master schedule of off-project as well as non-costed (but project related) scientific tasks. This list will be coordinated with the Physics Analysis Group convener, the Technical Coordinators, the Software Coordinator, and the L2 managers.*

*The Collaboration Technical Coordination Team are responsible to the co-spokespersons. They may have specific duties towards a subproject or across the entire project; these will be defined in specific charges to the coordinators. The general responsibilities of the TC's are defined here:*

- A) The Collaboration Technical Coordinators are responsible for communicating and verifying the scientific requirements to the project/subproject team.*
- B) The CTC shall serve on the sub-project technical board as a representative of the co-spokespersons. The CTC shall address the scientific impacts of the change control requests that are reviewed in the technical boards.*
- C) The CTC shall be responsible for identifying collaboration resources that could be of benefit to the project/subproject. These resources include scientific personnel, engineers, technical personnel, as well as facilities that might be useful for R&D, testing, management, construction, or quality assurance.*
- D) In addition, the CTC shall be responsible for identifying those tasks or scope that are needed to accomplish the scientific requirements but are not in the current work plan.*
- E) The CTC shall work with the Project Manager, subsystem managers, and institutional representatives to maximize the use of technical resources available. The CTC will coordinate allocation of collaboration resources (both personnel and facilities) needed to execute technical tasks for all phases of the project. Resources required for project activities will be documented in the project's resource-loaded schedule. Commitments for resources will be documented in individual institutional SOWs or MOUs as appropriate.*

## **ii. Collaboration R&D Coordinator(s)**

**Charge of the Collaboration R&D coordinators:** *The LBNE R&D collaboration coordinator(s) will convene the LBNE R&D Coordination Committee and make a monthly report to the LBNE spokespersons.*

### **A. Goals for the LBNE RDCC:**

- 1. Identify, categorize, and prioritize and document the R&D needs of LBNE for the beam, near, and far detectors. Maintain an R&D plan that will be carried out either within LBNE or in separately proposed efforts.*
- 2. Upon request from the spokespersons, the RDCC will review specific programs or proposals for relevance to LBNE R&D priorities and prepare a report.*

### **B. Membership of the committee.**

*From LBNE: RDCC Coordinator(s), the Physics Analysis Working Group convener, the Physics Tools Working Group Convener, the software and computing coordinator, the 35-ton prototype technical coordinator, and the 35-ton prototype manager, collaboration spokespersons, LBNE project director, LBNE far detector manager, beam technical coordinator, near detector manager.*

*From FNAL: The head of PPD or designated representative.*

*From Related R&D efforts or collaborations outside of LBNE: Where possible, an LBNE member who is also a participant in these efforts will be a member of the RDCC and act as liaison. If there is no LBNE member, a representative will be invited to participate in the RDCC meetings. The R&D Coordinator(s), in consultation with the spokesperson, will determine which groups fall in this category. Currently, they include:*

- o Coordinating Panel for Advanced Detectors (CPAD)*
- o Materials Test Stand*

- *Photon Detection System*
- *LArIAT*
- *CAPTAIN*
- *MicroBooNe*
- *NA61*

*C. For review of specific programs or activities relevant to LBNE, the co-spokespersons will prepare a charge. The RDCC report from such a review will be submitted to the LBNE co-spokespersons who will consult with the Executive Committee as needed.*

The R&D group report, as amended by the co-spokespersons, will form the basis of any communication with the DOE regarding LBNE R&D support.

### **iii. Collaboration Conventional Facilities Technical Coordinator**

**Charge of the Conventional Facilities Technical Coordinator:** *The Conventional Facilities (CF) subproject remains the largest single expense within LBNE. The Collaboration Conventional Facilities Technical Coordinator shall serve on the CF technical board. He/she is responsible for creation and maintenance of a requirements document (which could be part of the overall requirements document) that clearly identifies the requirements that drive the design and cost of the CF subproject. The CF CTC shall communicate with the CF Level-3 project manager and shall address the clarification, review, or change control requests that pertain to the scientific requirements of the experiment.*

### **iv. Collaboration Beam Technical Coordinator**

**Charge of the Collaboration Beam Technical Coordinator:** *The Collaboration Beam Technical Coordinator is responsible for coordinating the beam simulation tasks with the beam project management. He/she is responsible for maintaining a schedule of beam simulation activities and priorities. These priorities shall be updated on a regular basis and communicated to the Physics Analysis Group convener and the Physics Tools Group Convener. The Collaboration Beam Technical Coordinator is charged with identifying tasks and collaboration personnel for those tasks on behalf of the spokespersons.*

## **6. The 35t prototype Collaboration Technical Coordinator**

**Charge of the 35t prototype Collaboration Technical Coordinator:** *The 35t prototype CTC is responsible for the following:*

- i. Prioritize and maintain a schedule of collaboration activities regarding simulations, physics analysis.*
- ii. Prioritize and maintain a schedule of other collaboration service activities on the 35t prototype. These activities may include collaboration participation in assembly, commissioning, calibration, debugging, data-taking, shifts, etc.*
- iii. The responsibility of the 35t CTC shall including maintaining a database of contributions from the collaboration to the 35t prototyping.*
- iv. The 35t prototype CTC shall recruit collaboration personnel and resources by communicating with the institutional board members.*
- v. The 35t prototype CTC shall coordinate with the 35t prototype Level-3 manager as well as the liquid argon detector L-2 project manager. The 35t prototype CTC shall serve on the 35t technical board.*

## **vi. The CERN prototype Collaboration Technical Coordinator**

**Charge of the CERN prototype Collaboration Technical Coordinator:** *The CERN prototype CTC is responsible for the following*

- i. Prioritize and maintain a schedule of collaboration activities regarding simulations, physics analysis.*
- ii. Prioritize and maintain a schedule of other collaboration service activities on the CERN prototype. These activities may include collaboration participation in assembly, commissioning, calibration, debugging, data-taking, shifts, etc.*
- iii. The responsibility of the CERN prototype CTC shall including maintaining a database of contributions from the collaboration to the 35t prototyping.*
- iv. The CERN prototype CTC shall recruit collaboration personnel and resources.*
- v. The CERN prototype CTC shall coordinate with the LBNF far detector L-2 project manager.*

Several sub-groups are created to effectively execute the tasks required for the CERN prototype detector and beam test. These are:

“measurement program analysis” Their charge is: *to develop comprehensive and prioritized list of measurements need to evaluate detector performance and detector charged particle response to serve as input into LBNF physics sensitivity studies (beam physics, nucleon decay, supernovae, atmospheric neutrinos). And to perform simulation studies to quantitatively compare relevance of various measurements.*

“beam” Their charge is: *to work closely with the measurement group to identify ideal beam requirements, to work closely with the CERN beam group to develop realistic beam design to make relevant beam measurements, to evaluate and optimize possible beam injection points and beam orientations, to perform beam simulations and provide simulated beam spectra as input for detector response simulations, to identify required beam instrumentation for beam characterization, and to develop beam run plans.*

“calibration” Their charge is: *to develop tools to calibrate properties of the detector, to interface with the physics measurement group to prioritize different calibration measurements, and to interface with detector subcomponent working groups to identify all required calibration tools and their integration into the detector /cryostat design.*

## **E. Software and Computing Coordination**

**Charge of the Software Coordinator:** *The Software coordinator shall be appointed by and report to the Co-spokespeople, and interface and collaborate with the Project. The software coordinator shall be responsible for the Software Infrastructure Working Group (SIWG). The Software Coordinator is responsible for implementation of policies and processes in the following categories:*

- a. Documentation*
- b. Software Release Management and Infrastructure*
- c. Coding Standards and Compatibility with the Distributed Computing Model*
- d. Workflow Management*
- e. Data Management*
- f. Databases*
- g. Data Integration*

*This will require coordinating and facilitating the effort of a diverse set of individuals involved in software activities in the LBNE Science Collaboration and on the LBNE Project. The software coordinator shall collaborate closely with the LBNE Computing Coordinator on matters of computing resources at Fermilab as well as access to those resources for the collaboration.*

*The Software Coordinator is specifically charged to:*

- a. Select appropriate programming language platforms and technologies for various software components*
- b. Establish procedures for efficient Workflow Management*
- c. Ensure the development of software infrastructure improvements*
- d. Participate in and, when directed specifically by the Co-spokespeople, direct the development, testing or maintenance of software components and manage personnel assigned to such specific tasks*
- e. Oversee and manage the establishment of a software release and validation process, including establishing validation criteria*
- f. Oversee the application of and ensure compliance with LBNE coding practices and standards (including documentation) in the development of LBNE software components*
- g. Ensure interoperability between heterogeneous systems used in LBNE, by establishing and insuring the use of mandatory common data formats, data schemas and protocols*
- h. Supervise personnel assigned to the software release validation process, and to other specific tasks as decided by the Co-spokespeople*
- i. Initiate and conduct internal and external reviews of the software systems for LBNE in consultation with the Spokespeople and the Project Director.*
- j. Interface with software efforts on the LBNE Project as specified by the Project Director.*

## **F. NSF Working Group**

The mission of the NSF Working Group is to explore how NSF can participate in LBNE construction in a substantial manner. It will be co-chaired by the co-spokespersons. Membership is open to any senior member of the collaboration who may participate in a future proposal.

## **G. International Advisory Group**

The International Advisory Group (IAG) is established by the spokespersons to advise them on issues related to the international organization aspects of the collaboration. Membership of this group will typically include at least one collaborator from each country who is knowledgeable about the funding agencies and research resources in the country. The IAG is not intended as an official conduit to funding agencies or to negotiate financial or in-kind contributions to the project.

## **H. Other Responsibilities**

1. FNAL computing/DOCDB
2. Webmaster
3. Young LBNE organization
4. Collaboration by-laws

5. Collaboration author/email lists
6. LArSoft representative



### **3. Collaboration Personnel (November 2014)**

#### **A. Spokespersons**

Milind Diwan (2009-2015)  
Bob Wilson (2013-2014)

Deputy: Maury Goodman (2009-2014)

#### **B. Project Managers**

The LBNE Project Organization is described in detail in the Project Management Plan found in docdb-2543. The top level responsibilities are:

Project Director	Jim Strait
Project Manager	Elaine McCluskey
Project Scientist	Mary Bishai
Level 2-Beam	Vaia Papadimitriou
Level 2-Near Detector	Chris Mauger
Level 2-Far Detector	Jim Stewart
Level 2-Civil Construction	Tracy Lundin

#### **C. LBNE Institutional Board**

UFABC	Celio Moura
IOP-ASCR	Milos Lokajicek
Alabama:	Ion Stancu
Alfnas	Gustavo Valdivieso
Argonne:	Maury Goodman
Boston:	Edward Kearns
Brookhaven:	Milind Diwan
California-Davis	Robert Svoboda
California-Irvine	Henry Sobel
California-LA	Hanguo Wang
Cambridge:	Mark Thomson
Campinas	Ernesto Kemp
Catania:	Vincenzo Bellini
Charles	Karel Soustruznik
Chicago:	Edward Blucher
Cincinnati	Alex Sousa
Colorado:	Alysia Marino
Colorado State:	Robert Wilson
Columbia:	Mike Shaevitz
CTU	Filip Jedny
Dakota State:	Barbara Szczerbinska

Drexel:	Charles Lane
Duke:	Kate Scholberg
Feira de Santana	Germano Pinto Guedes
Fermilab:	Regina Rameika
Goiás	Ricardo Gomes
GSSI	Carlo Rubbia
Hawai'i:	John Learned
Houston:	Lisa Whitehead
India:	Brajesh Chandra Choudhary
Indiana:	John Urheim
INR	Dmitry Gorbunov
Iowa State:	Mayly Sanchez
Kansas State:	Glenn Horton-Smith
Kavli (Tokyo):	Mark Vagins
LNGS Gran Sasso	Chiara Vignoli
Lancaster	Peter Ratoff
Lawrence Berkeley:	Vic Gehman
Lawrence Livermore:	Adam Bernstein
Liverpool	Christos Touramanis
London:	Jenny Thomas
Los Alamos:	Christopher Mauger
LSU:	Thomas Kutter
Manchester	Stefan Söldner-Rembold
Maryland:	Erik Blaufuss
MIT	Janet Conrad
Michigan State:	Carl Bromberg
Milano	Paula Sala
Milano Bicocca	Maurizio Bonesini
Minnesota:	Marvin Marshak (Chair: 2010-2014)
Minnesota-Duluth:	Richard Gran
Napoli	Alfredo Cocco
National CNR	Robert Sulej
NGA:	Stephen Malys
Northwestern:	Heidi Schellman
Notre Dame:	John Losecco
Oxford:	Giles Barr
Padova	Alberto Guglielmi
Pavia	Claudio Montanari
Pennsylvania:	Joshua Klein
Pittsburgh:	Donna Naples
Princeton:	Kirk McDonald
Rochester:	Kevin McFarland
SLAC	Mark Convery
STFC-RAL	Alfons Weber
Sheffield	Neil Spooner
South Carolina:	Roberto Petti
South Dakota	Dongming Mei
SDSMT:	Xinhua Bai
SDSTA	Mike Headley

South Dakota State:	Robert McTaggart
Southern Methodist:	Thomas Coan
Stonybrook	Clark McGrew
Sussex:	Jeff Hartnell
Syracuse:	Mitch Soderberg
Tennessee:	Thomas Handler
Texas:	Karol Lang
Texas-Arlington	Jae Yu
Tufts:	Hugh Gallagher
Virginia Tech:	Jonathan Link
Warwick	Gary Barker
Washington:	Nikolai Tolich
William and Mary:	Robert McKeown
Wisconsin	Bob Paulos
Yale:	Bonnie Fleming
Yerevan	Ara Ioannisian
Young LBNE observer:	Georgia Karagiorgi

#### **D. LBNE Executive Committee, 2013**

[ *Ex-officio members from the collaboration*]

Marvin Marshak (IB Chairperson for 2013)  
 Robert Wilson (cospokesperson)  
 Milind Diwan (cospokesperson)  
 Maury Goodman (deputy spokesperson for 2013)  
 Jon Urheim (Physics Working Group Convener)  
 Tom Junk (Physics Tools Working Group Convener)

[*Ex-officio members from the project*]

Jim Strait (Project Director)

[*Three members were elected for 1 Jan 2014 – 31 December 2014*]

Robert Svoboda	Davis
Bonnie Fleming	Yale
Mark Thomson	Cambridge

[*Three more members will be appointed for 1 Jan 2014 – 31 December 2014*]

Bill Louis	LANL
Ed Blucher	Chicago
Joshua Klein	Penn

[*Young LBNE Observer*]

Vic Gehman	LBNL
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## E. Physics Analysis Working Groups

Convener	Jon Urheim
Long-Baseline Neutrinos	Dan Cherdack, Elizabeth Worcester
Atmospheric Neutrinos	Hugh Gallagher
Proton Decay	Ed Kearns
Galactic SN Burst	Kate Scholberg
Diffuse Supernova	Mark Vagins
Other (including Solar, Reactor and Geo-neutrinos)	Michael Smy
Short-Baseline/Near Detector Physics	Sanjib Mishra/Chris Mauger

## F. Physics Tools Working Groups

Convener	Thomas Junk
Electron and Photon Production and Transport - Far Detector Simulation	Matthew Szydagis, Brian Rebel Eric Church
Event Reconstruction (Near and Far) - Cross Sections and Nuclear Models - Cosmic Rays and Cosmogenics - Near Detector Simulation	Stan Seibert, Mike Kirby Camillo Mariani, Martin Tzanov Vitaly Kudryavtsev, Dongming Mei Kevin Yarritu
Beam Systematics	Kevin Yarritu, Laura Fields
Radiological and Cleanliness Models - Monte Carlo Production	Xinhua Bai, Vic Gehman Jeff Hartnell
DAQ/Online	Giles Barr, Mathew Graham

## G. Speakers Committee

Chair –	Vittorio Paolone
Members – Goodman	Stefan Soldner-Remhold, Jim Napolitano, Maury

## H. R&D Coordination Committee

- Collaboration Technical Coordinators - convened by co-spokespersons (interim) (Sep 10, 2013)
- R&D Coordinators: Jaehoon Yu and Zelimir Djurcic (co-conveners) (Sep 10, 2013)
- Appointed members of RDCC are:
  - Beam: Alberto Marchionni (March 25, 2013)
  - 35ton technical coordinators: Mark Convery (co-convener) and Michelle Stancari (co-convener) (March 25, 2013)
  - Physics Analysis WG: Jon Urheim
  - Physics Tools WG: Tom Junk

- Software and Computing Coordinator(s): Tom Junk and Maxim Potekhin
- 35 ton hardware coordinator: Alan Hahn
- spokespersons: Milind Diwan, Robert Wilson, Maury Goodman
- Project: Jim Strait, James Stewart
- Near Detector: Chris Mauger
- Fermilab: Mike Lindgren

Invited participants of RDCC representing other efforts:

- Coordinating Panel for Advanced Detectors (CPAD) – Craig Thorn
- Materials Test Stand – Stephen Pordes
- LAPD/Long Bo – Brian Rebel
- Photon Detection – Norm Buchanan
- LArIAT – Jen Raaf
- CAPTAIN - Christopher Mauger
- MicroBoone – Regina Rameika
- NA61/Muon counters – Jeff Mills

## I. Software and Computing Coordinator

Convener: Maxim Potekhin (2013) and Elizabeth Sexton-Kennedy(2014)

- Software Infrastructure Mike Kirby and Brett Viren
- Data Handling Qizhong Li
- Databases Jonathan Paley
- Distributed Processing(Grid, Workload Mgt) Maxim Potekhin
- Collaborative Tools Eileen Berman and Brett Viren

## J. NSF Working Group

The mission of the NSF Working Group is to explore how NSF can participate in LBNE construction in a substantial manner.

The (February 2014) membership is:

- Bob Paulos (Wisconsin and IceCube)
- Greg Sullivan (Maryland)
- Josh Klein (UPenn)
- Carl Bromberg (Michigan State)
- Jim Stewart (BNL manager for LAr detector)
- Bob Svoboda (UC/Davis)
- Edward Blucher (Chicago)
- Mike Shaevitz (Columbia)
- Karsten Heeger (Yale)
- Bob Wilson (Colorado State, LBNE spokesperson)
- Jim Strait (FNAL LBNE project director)
- Bonnie Fleming (Yale) CHAIR
- Hugh Gallagher (Tufts)
- Maury Goodman (Argonne, LBNE deputy spokesperson)
- Milind Diwan (BNL LBNE spokesperson)
- Xinhua Bai (SDSMT)
- Mary Bishai (BNL)
- Thomas Kutter (LSU)
- Laurence Littenberg (BNL)
- Marvin Marshak (Minn)
- Chris Mauger (LANL)

Elaine McCluskey (FNAL)  
Bill Rogenthen (SDSMT)  
David Schmitz (Chicago)  
Mitch Soderberg (Syracuse)

### **K. CERN prototype Technical Coordinators (2014)**

**Thomas Kutter (LSU) and Greg Pawloski (Minnesota)**

**Measurement subgroup leader – Donna Naples (Pittsburgh) and Jaroslaw Nowak (Lancaster)**

**Beam subgroup leader – Cheng-Ju Lin (LBNL)**

### **L. Other Responsibilities**

- FNAL computing/DOCDB Eileen Berman
- Webmaster Anne Heavey
- Young LBNE organization Andre Szelc (2013)
- Collaboration by-laws IB Chair-Marshak (see docdb-137)
- Collaboration author/email lists Deputy Spokesperson-Goodman (see docdb-270)
- LArSoft representative Rick Snyder (2013)
- Conventional Facilities R&D Robert Svoboda (2013)
- Local FNAL safety coordinators Thomas Junk and Michelle Stancari (2014)

## **4. Special Assignments**

**A. Software Planning Document (available in docdb-7818) dated 23 Sep 2013**

**B. CERN Prototype EOI (available in docdb-9413 and CERN-SPSC-2014-027; SPSC-EOI-011) dated 26 September 2014**

## **5. Organization Chart**

