

VITA

Sanjib R. Mishra

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Education:

M.Sc.(Hons.& Distinction) in Physics	B.I.T.S. Pilani	Dec, 1979
M.Sc.(Hons.& Distinction) in Mathematics	B.I.T.S. Pilani	Aug, 1980
M.A.	Columbia University	May, 1982
M.Phil.	Columbia University	May, 1983
Ph.D. in Physics	Columbia University	Mar, 1986

Positions:

Lecturer	B.I.T.S. Pilani	1979-1980
Teaching Assistant	Columbia University	1980-1981
Graduate Research Assistant	Columbia University	1982-1985
Post-Doc. Research Scientist	Columbia University	1986-1988
Senior Research Scientist	Columbia University	1989-1990
Assistant Professor	Harvard University	1991-1992
Associate Professor	Harvard University	1993-1999
Professor	Univ. of South Carolina	2000-
Guest Scientist	Fermilab (FNAL)	2003-2005

Awards

- The DOE Outstanding Investigator Award, 1993.
- The Alfred P. Sloan Fellowship Award, 1994.
- The Cottrell Award, 1995.
- The Milton Award, 1996, for research.
- The Clark-Tozier Award, 1996, for undergraduate teaching and research.
- The Hoops prize, 1997, for teaching and supervising undergraduate research.

Professional Service

- Served on the review panel for the TNRLC research grants, 1992.
- Served on the neutrino committee of the PAC at FNAL, 1994.
- Member of the Editorial Committee of the NOMAD collaboration, 1996 to present.
- Co-chair the THESEUS task force of MINOS collaboration, 1999 till 2001.
- Member of the Calibration task force of MINOS collaboration, 1999 till 2001.
- Member of the Beam Monitoring task force of MINOS collaboration, 2000 till 2001.
- Served on the Department of Energy (DoE) Outstanding Junior Investigator (OJI) Panel, 2006—2007.

Review Articles

- [a]: “Deep-Inelastic Lepton-Nucleon Scattering”, S.R.Mishra and F.Sciulli, Ann. Rev. Nucl. Part. Sci. **39**, 259(1989).
- [b]: “Rare Processes in ν -N Interactions”, S.R. Mishra, review talk presented at Neutrino '88, Boston. Proceedings of The 13th. International Conference on Neutrino Physics and Astrophysics, ed.J.Schneps *et al.*, World Scientific, Boston(1988) pp.259.
- [c]: “Probing Hadron Structure with Neutrino Experiments”, S.R.Mishra, review talk presented at Workshop on Hadron Structure Functions and Parton Distributions, Fermilab, Apr.1990; World Scientific, 84-123(1990), Ed. D.Geesaman *et al.*; Nevis Preprint # 1426, Jun(1990);
- [d]: “Lorentz Structure of Weak Current and Inverse Muon Decay”, S.R.Mishra, Nuclear Physics, **19**, 193(1991). review talk at Neutrino '90, CERN Geneva. Nevis Preprint # 1429, Sep(1990).
- [e]: “A Review of $\sin^2\theta_W$ Measurement in ν -N Scattering”, S.R. Mishra, review talk at Neutral Current Conference, Paris, 1993.
- [f]: “Nucleon Structure & Precision Test of Electroweak Unification in High Energy Neutrino Interaction”, S.R. Mishra, review talk at Neutrino in Particle Physics & Cosmology, Erice, Sicily, 1993.
- [g]: “Neutrino Mass and Oscillation”, S.R. Mishra, review lectures presented at the SLAC Summer Institute at Stanford, Aug.1994.
- [h]: “A Handbook of Perturbative QCD”, A review article written with physicists in the CTEQ collaboration; published in Rev. of Mod. Phys., 1995.
- [i]: “Neutrino Anomalies”, S.R. Mishra, review talk at the Division of Particle and Field (DPF) Conference, Minneapolis, Aug.1996.
- [j]: “Review of Neutrino Oscillation Searches at the Accelerators”, S.R. Mishra, Rappateur talk at the American Physical Society (APS) Meeting, Washington D.C., Apr.1997.
- [k]: “Status of Neutrino Oscillation Searches”, S.R. Mishra, review talk at the Coral Gables Conference, Miami, Dec.1997.
- [l]: “Dark Matter & Neutrinos”, S.R. Mishra, review talk at the Tropical Workshop on Particle physics & Cosmology, Puerto Rico, Apr.1998.

[**m**]: “A Review of Neutrino Oscillations at the Accelerators”, S.R. Mishra, review talk at the Cosmo-98, California, Nov.1998.

[**n**]: “Neutrino Oscillations”, S.R. Mishra, review talk at the Cosmo-99, Trieste, Aug-Sep.1999.

[**o**]: “A Review of Neutrino Oscillation Search at Accelerators”, S.R. Mishra, review talk at the Carolina Symposium on Neutrino Physics; Proceedings published by World Scientific, Mar 2000.

[**p**]: “NO ν A and its Competitors: A Comparative Review of Search for Θ_{13} and Leptonic CP-Violation” Sanjib R. Mishra, Rappateur talk at the Americal Physical Society (APS) Meeting, Jacksonville, Florida, Apr.2007.

[**q**]: “A Review of the NuMI and MINOS Projects at Fermilab”, Sanjib R. Mishra, Rappateur talk at the Americal Physical Society (APS) Meeting, Jacksonville, Florida, Apr.2007.

References

Articles in Refereed Journals

- [1] S. R. Mishra *et al.*, “Search For Neutral Heavy Leptons From Neutrino N Scattering,” Phys. Rev. Lett. **59**, 1397 (1987).
- [2] S. R. Mishra *et al.*, “Measurement Of Inverse Muon Decay Muon-Neutrino + E \rightarrow Mu- + Electron-Neutrino At Fermilab Tevatron Energies 15-Gev - 600-Gev,” Phys. Rev. Lett. **63**, 132 (1989).
- [3] F. S. Merritt *et al.*, “Hadron Shower Punchthrough For Incident Hadrons Of Momentum 15-Gev/C, 25-Gev/C, 50-Gev/C, 100-Gev/C, 200-Gev/C, And 300-Gev/C,” Nucl. Instrum. Meth. A **245**, 27 (1986).
- [4] B. A. Schumm *et al.*, “Neutrino Production Of Same Sign Dimuons,” Phys. Rev. Lett. **60**, 1618 (1988).
- [5] S. R. Mishra and F. Sciulli, “Deep Inelastic Lepton - Nucleon Scattering,” Ann. Rev. Nucl. Part. Sci. **39**, 259 (1989).
- [6] C. Foudas *et al.*, “Neutrino Production Of Opposite Sign Dimuons At Tevatron Energies,” Phys. Rev. Lett. **64**, 1207 (1990).
- [7] S. R. Mishra *et al.*, “A Study Of Wrong Sign Single Muon Production In Muon-Neutrino - Nucleon Interaction,” Z. Phys. C **44**, 187 (1989).
- [8] P. G. Reutens *et al.*, “A Measurement Of The Neutral Current Electroweak Parameters Using The Fermilab Narrow Band Neutrino Beam,” Z. Phys. C **45**, 539 (1990).
- [9] P. H. Sandler *et al.*, “Hadron Shower Punchthrough And Muon Production By Hadrons Of 40-Gev, 70-Gev And 100-Gev,” Phys. Rev. D **42**, 759 (1990).
- [10] W. K. Sakumoto *et al.*, “Calibration Of The Ccfr Target Calorimeter,” Nucl. Instrum. Meth. A **294**, 179 (1990).

- [11] S. R. Mishra and F. Sciulli, “Do Present Deep Inelastic Scattering Data Demonstrate $R = R$ (QCD),” *Phys. Lett. B* **244**, 341 (1990).
- [12] P. S. Auchincloss *et al.*, “Measurement Of The Inclusive Charged Current Cross-Section For Neutrino And Anti-Neutrino Scattering On Isoscalar Nucleons,” *Z. Phys. C* **48**, 411 (1990).
- [13] S. R. Mishra *et al.*, “Inverse Muon Decay, Muon-Neutrino $E \rightarrow \mu^-$ Electron-Neutrino, At The Fermilab Tevatron,” *Phys. Lett. B* **252**, 170 (1990).
- [14] W. H. Smith *et al.*, “Nucleon structure functions from muon-neutrino - Fe scattering at the Tevatron,” *Nucl. Phys. Proc. Suppl.* **19**, 281 (1991).
- [15] B. J. King *et al.*, “Measuring muon momenta with the CCFR neutrino detector,” *Nucl. Instrum. Meth. A* **302**, 254 (1991).
- [16] S. R. Mishra *et al.* [CCFR Collaboration], “Neutrino tridents and W Z interference,” *Phys. Rev. Lett.* **66**, 3117 (1991).
- [17] W. K. Sakumoto *et al.*, “A Measurement of TeV muon energy loss in iron,” *Phys. Rev. D* **45**, 3042 (1992).
- [18] E. Oltman *et al.*, “Nucleon structure functions from high-energy neutrino interactions. FNAL-616/701 experiment,” *Z. Phys. C* **53**, 51 (1992).
- [19] S. R. Mishra *et al.*, “Search for righthanded coupling in neutrino N scattering,” *Phys. Rev. Lett.* **68**, 3499 (1992).
- [20] P. H. Sandler *et al.*, “Neutrino production of same sign dimuons at the Fermilab Tevatron,” *Z. Phys. C* **57**, 1 (1993).
- [21] A. Caldwell *et al.*, “Design and implementation of a high precision readout system for the ZEUS calorimeter”, *Nucl. Instrum. Meth. A* **321**, 356 (1991).
- [22] P. Z. Quintas *et al.*, “A Measurement of Lambda (MS) from muon-neutrino - Fe nonsinglet structure functions at the Fermilab tevatron,” *Phys. Rev. Lett.* **71**, 1307 (1993).

- [23] W. C. Leung *et al.*, “A Measurement of the Gross-Llewellyn-Smith sum rule from the CCFR $x(F_3)$ structure function,” *Phys. Lett. B* **317**, 655 (1993).
- [24] S. A. Rabinowitz *et al.*, “Measurement of the strange sea distribution using neutrino charm production,” *Phys. Rev. Lett.* **70**, 134 (1993).
- [25] P. S. Auchincloss *et al.*, “A Study of the energy dependence of the mean, truncated mean, and most probable energy deposition of high-energy muons in sampling calorimeters,” *Nucl. Instrum. Meth. A* **343**, 463 (1994).
- [26] T. Kinnel *et al.*, “Hadron shower energy and direction measurements using drift chambers,” *Nucl. Instrum. Meth. A* **340**, 474 (1994) [Erratum-*ibid.* A **345**, 609.1994 ERRAT,A365,607 (1994)].
- [27] C. Arroyo *et al.* [CCFR Collaboration], “A Precise measurement of the weak mixing angle in neutrino nucleon scattering,” *Phys. Rev. Lett.* **72**, 3452 (1994) [hep-ex/9405008].
- [28] A. O. Bazarko *et al.* [CCFR Collaboration], “Determination of the strange quark content of the nucleon from a next-to-leading order QCD analysis of neutrino charm production,” *Z. Phys. C* **65**, 189 (1995) [hep-ex/9406007].
- [29] K. S. McFarland *et al.*, “A Limit on muon-neutrino (anti-muon-neutrino) \rightarrow tau-neutrino (anti-tau-neutrino) oscillations from a precision measurement of neutrino - nucleon neutral current interactions,” *Phys. Rev. Lett.* **75**, 3993 (1995) [hep-ex/9506007].
- [30] U. K. Yang *et al.*, “A measurement of $R = \sigma(L)/\sigma(T)$ in deep inelastic neutrino nucleon scattering at the Tevatron,” *J. Phys. G* **G22**, 775 (1996) [hep-ex/9605005].
- [31] A. Romosan *et al.* [CCFR/NuTeV Collaboration], “A high statistics search for ν/μ (anti- ν/μ) \rightarrow ν/e (anti- ν/e) oscillations in the small mixing angle regime,” *Phys. Rev. Lett.* **78**, 2912 (1997) [hep-ex/9611013].
- [32] W. G. Seligman *et al.*, “Improved determination of $\alpha(s)$ from neutrino nucleon scattering,” *Phys. Rev. Lett.* **79**, 1213 (1997).

- [33] K. S. McFarland *et al.* [CCFR Collaboration], “A precision measurement of electroweak parameters in neutrino nucleon scattering,” *Eur. Phys. J. C* **1**, 509 (1998) [hep-ex/9701010].
- [34] A. P. Chikkatur *et al.* [NuTeV/CCFR Collaboration], “Tests of a calorimetric technique for measuring the energy of cosmic ray muons in the TeV energy range,” *Z. Phys. C* **74**, 279 (1997).
- [35] J. Altegoer *et al.* [NOMAD Collaboration], “The NOMAD experiment at the CERN SPS,” *Nucl. Instrum. Meth. A* **404**, 96 (1998).
- [36] G. Ambrosini *et al.* [SPY Collaboration], “K/pi production ratios from 450-GeV/c protons on beryllium,” *Phys. Lett. B* **420**, 225 (1998).
- [37] J. Altegoer *et al.* [NOMAD Collaboration], “Search for a new gauge boson in pi0 decays,” *Phys. Lett. B* **428**, 197 (1998) [hep-ex/9804003].
- [38] J. Altegoer *et al.* [NOMAD Collaboration], “A search for nu/mu \rightarrow nu/tau oscillations using the NOMAD detector,” *Phys. Lett. B* **431**, 219 (1998).
- [39] G. Ambrosini *et al.* [SPY Collaboration], “Pion yield from 450-GeV/c protons on beryllium,” *Phys. Lett. B* **425**, 208 (1998).
- [40] J. H. Kim *et al.*, “A measurement of $\alpha(s)(Q^{*2})$ from the Gross-Llewellyn Smith sum rule,” *Phys. Rev. Lett.* **81**, 3595 (1998) [hep-ex/9808015].
- [41] D. Naples *et al.* [CCFR/NuTeV Collaboration], “A high statistics search for nu/e (anti-nu/e) \rightarrow nu/tau (anti-nu/tau) oscillations,” *Phys. Rev. D* **59**, 031101 (1999) [hep-ex/9809023].
- [42] J. Altegoer *et al.* [NOMAD Collaboration], “Precision measurement of scaled momentum, charge multiplicity and thrust in nu/mu N and anti-nu/mu N interactions,” *Phys. Lett. B* **445**, 439 (1999).
- [43] P. Astier *et al.* [NOMAD Collaboration], “A more sensitive search for nu/mu \rightarrow nu/tau oscillations in NOMAD,” *Phys. Lett. B* **453**, 169 (1999).
- [44] G. Ambrosini *et al.* [NA56/SPY Collaboration], “Measurement of charged particle production from 450-GeV/c protons on beryllium,” *Eur. Phys. J. C* **10**, 605 (1999).

- [45] M. Vakili *et al.* [CCFR Collaboration], “Nuclear structure functions in the large x large Q^{*2} kinematic region in neutrino deep inelastic scattering,” *Phys. Rev. D* **61**, 052003 (2000) [hep-ex/9905052].
- [46] B. T. Tammenga *et al.* [CCFR Collaboration], “Low- Q^{*2} low- x structure function analysis of CCFR data for F2,” *Nucl. Phys. A* **663**, 344 (2000) [hep-ex/9908064].
- [47] P. Astier *et al.* [NOMAD Collaboration], “Limit on $\nu/e \rightarrow \nu/\tau$ oscillations from the NOMAD experiment,” *Phys. Lett. B* **471**, 406 (2000).
- [48] T. Adams *et al.* [NuTeV/CCFR Collaborations], *Nucl. Phys. Proc. Suppl.* **86**, 93 (2000).
- [49] P. Astier *et al.* [NOMAD Collaboration], “Search for eV (pseudo)scalar penetrating particles in the SPS neutrino beam,” *Phys. Lett. B* **479**, 371 (2000).
- [50] P. Astier *et al.* [NOMAD Collaboration], “Updated results from the ν/τ appearance search in NOMAD,” *Phys. Lett. B* **483**, 387 (2000).
- [51] P. Astier *et al.* [NOMAD Collaboration], “Neutrino production of opposite sign dimuons in the NOMAD experiment,” *Phys. Lett. B* **486**, 35 (2000).
- [52] P. Astier *et al.* [NOMAD Collaboration], “Measurement of the Lambda polarization in ν/μ charged current interactions in the NOMAD experiment,” *Nucl. Phys. B* **588**, 3 (2000).
- [53] U. K. Yang *et al.* [CCFR/NuTeV Collaboration], “Measurements of F2 and $xF_3(\nu) - xF_3(\text{anti-}\nu)$ from CCFR ν/μ Fe and $\text{anti-}\nu/\mu$ Fe data in a physics model independent way,” *Phys. Rev. Lett.* **86**, 2742 (2001) [hep-ex/0009041].
- [54] B. T. Fleming *et al.* [CCFR Collaboration], “A first measurement of low x low Q^{*2} structure functions in neutrino scattering,” *Phys. Rev. Lett.* **86**, 5430 (2001) [hep-ex/0011094].
- [55] P. Astier *et al.* [NOMAD Collaboration], “Search for heavy neutrinos mixing with tau neutrinos,” *Phys. Lett. B* **506**, 27 (2001) [hep-ex/0101041].

- [56] P. Astier *et al.* [NOMAD Collaboration], “Inclusive production of $\rho^0(770)$, $f_0(980)$ and $f_2(1270)$ mesons in ν/μ charged current interactions,” Nucl. Phys. B **601**, 3 (2001) [hep-ex/0103017].
- [57] P. Astier *et al.* [NOMAD Collaboration], “Measurement of the anti-Lambda polarization in ν/μ charged current interactions in the NOMAD experiment,” Nucl. Phys. B **605**, 3 (2001) [hep-ex/0103047].
- [58] P. Astier *et al.* [NOMAD Collaboration], Nucl. Phys. B **609**, 255 (2001) [arXiv:hep-ex/0105048].
- [59] P. Astier *et al.* [NOMAD Collaboration], “Final NOMAD results on $\nu/\mu \rightarrow \nu/\tau$ and $\nu/e \rightarrow \nu/\tau$ oscillations including a new search for ν/τ appearance using hadronic tau decays,” Nucl. Phys. B **611**, 3 (2001)
- [60] U. K. Yang *et al.* [CCFR/NuTeV Collaboration], Phys. Rev. Lett. **87**, 251802 (2001) [arXiv:hep-ex/0104040].
- [61] A. Bodek *et al.* [CCRF/NuTeV Collaboration], Int. J. Mod. Phys. A **16S1A**, 202 (2001) [arXiv:hep-ex/0009061].
- [62] P. Astier *et al.* [NOMAD Collaboration], Phys. Lett. B **526**, 278 (2002).
- [63] P. Astier *et al.* [NOMAD Collaboration], Nucl. Phys. B **621**, 3 (2002) [arXiv:hep-ex/0111057].
- [64] P. Astier *et al.* [NOMAD Collaboration], Phys. Lett. B **527**, 23 (2002).
- [65] P. Astier *et al.* [NOMAD Collaboration], Phys. Lett. B **570**, 19 (2003) [arXiv:hep-ex/0306037].
- [66] P. Astier *et al.* [NOMAD Collaboration], Nucl. Instrum. Meth. A **515**, 800 (2003) [arXiv:hep-ex/0306022].
- [67] P. Astier *et al.* [NOMAD Collaboration], Nucl. Phys. B **686**, 3 (2004) [arXiv:hep-ex/0404011].
- [68] D. Naumov *et al.* [NOMAD Collaboration], Nucl. Phys. B **700**, 51 (2004) [arXiv:hep-ex/0409037].

- [69] A. Chukanov *et al.* [NOMAD Collaboration], *Eur. Phys. J. C* **46**, 69 (2006) [arXiv:hep-ex/0604050].
- [70] D. G. Michael *et al.* [MINOS Collaboration], “Observation of muon neutrino disappearance with the MINOS detectors and the NuMI neutrino beam,” *Phys. Rev. Lett.* **97**, 191801 (2006) [arXiv:hep-ex/0607088].
- [71] P. Adamson *et al.* [MINOS Collaboration], “First observations of separated atmospheric ν/μ and anti- ν/μ events in the MINOS detector,” *Phys. Rev. D* **73**, 072002 (2006) [arXiv:hep-ex/0512036].

Colloquia and Seminars

I include a partial list of invited colloquia and seminars at various institutions. These were given from 1988 to the present. Slightly less frequent in the early years, from 1991 till now, the talks were more or less evenly distributed in years. The exact titles and dates quoted here are from memory — I might have transposed some of these. The institutions, however, are correct as my travel record shows. The institutions are:

• **Fermilab (FNAL-Illinois)** — 6 times. The titles and dates of the ‘Wine & Cheese’ and ‘Colloquium’ talks were:

- ‘Inverse Muon Decay’, 1987.
- ‘First Evidence of the W-Z Interference in the ν_μ -Interaction’, 1989.
- ‘Probing Nucleon Structure with High Energy Neutrinos’, 1990.
- ‘Precision Measurement of the Nucleon Structure Functions, xF_3 and F_2 , in the ν_μ -N Interactions’, 1991.
- ‘A Study of Double Vertices in the CCFR Detector’, 1992.
- ‘The $\nu_\mu \rightsquigarrow \nu_\tau$ Oscillation’, 1998.

• **Stanford University (SLAC)** — 4 times. The titles and approximate dates of the talks were:

- ‘Precision Measurement of the Nucleon Structure Functions, xF_3 and F_2 , in the ν_μ -N Interactions’, 1991.
- “A Study of Double Vertices in the CCFR Detector”, 1992.
- “Neutrino Mass and Oscillation”, 1995. This was a series of invited lectures.
- “The MINOS/NuMI Project at Fermilab”, 2006.

• **C.E.R.N (Geneva)** — 2 times. The titles and approximate dates of the talks were:

- ‘Precision Measurement of the Nucleon Structure Functions, xF_3 and F_2 , in the ν_μ -N Interactions’, 1993.
- “Neutrino Oscillation”, 1997.
- **DESY (Hamburg)**: “Precision Tests of Perturbative Quantum Chromodynamics in ν -N Scattering”, 1993.
- **Saclay (Paris)**: “Confronting the Existing Anomalies in Nucleon Structure Functions and Perturbative QCD Tests”, 1995.
- **Harvard University** — 3 times. The titles and dates of the colloquia were.
 - “Beautiful Physics with Neutrinos”, 1991.
 - “Double Vertices in the CCFR Detector”, 1992.
 - “Hunting for the Missing Universe”, 1999.
- **Massachusetts Institute of Technology** — 3 times. The titles and dates of the talks were:
 - “Beautiful Physics with Neutrinos”, 1992.
 - “Double Vertices in the CCFR Detector”, 1993.
 - “Neutrino Oscillations — Discovery -vs- Limits”, 1997.
- **Princeton University** — 4 times;
 - “Recent Results from the CCFR Collaboration”, 1989.
 - “Precision Tests of Perturbative Quantum Chromodynamics using Singlet and Non-Singlet Structure Functions”, 1995.
 - “Search for Neutral Heavy Leptons”, 1996.
 - “A Review of Neutrino Oscillations”, 2000.
- **Columbia University** — 3 times;

- “First Evidence of W-Z Destructive Interference in ν_μ -N Interactions”, 1989.
- “A Search for Right Handed Currents”, 1990.
- “Singlet and Non-Singlet Nucleon Structure Functions”, 1991.
- **Boston University**: “Quest for Neutrino Oscillation — NOMAD at CERN”, 2000.
- **University of Minnesota**: “Searching for New Physics using Neutrinos”, 1999.
- **University of Chicago** — 2 times;
 - “Precision Measurements in the ν -Interactions”, 1991.
 - “Double Vertices in the CCFR Experiment”, 1992.
- **Cornell University**: “Double Vertices in the CCFR Experiment”, 1992.
- **University of Illinois (Urbana-Champaign)**: “Beautiful Physics using High Energy Neutrinos”, 1991.
- **University of Wisconsin**: “Structure Functions: Zeus -vs- CCFR”, 1992.
- **University of Colorado (Boulder)**: “Beautiful Physics using High Energy Neutrinos”, 1991.
- **University of California, Berkeley** — 2 times;
 - “Two Electroweak Results using Low-Y ν_μ Interactions: Inverse Muon Decay and W-Z Interference”, 1991.
 - “Physics Programme in a High Energy Neutrino Experiment”, 1993.
- **University of South Carolina**: — 2 times. The titles and dates of the talks were:
 - “Recent Results of the NOMAD Experiment”, 1998.
 - “Hunting for the Missing Universe”, 2000.
- **Marshall Space Centre (Huntsville)**: “Cosmology and Neutrino Physics”, 1992.
- **University of Michigan (Ann-Arbor)**: “A Search for $\nu_\mu \rightsquigarrow \nu_\tau$ Oscillation — Criteria for Establishing a Discovery”, 1997.

- **Michigan State University:** “Novel Results from Low-Y ν_μ -Interactions”, 1989.
- **University of Dortmund — 4 times:** The titles and dates of the talks were:
 - “Recent Precision Results from the CCFR Collaboration”, 1993.
 - “Results from the NOMAD Collaboration”, 1997.
 - “A Review of Neutrino Oscillation”, 2000.
 - “Controlled Neutrino Oscillation Search: CCFR -vs- NOMAD -vs- MINOS”, 2001.
- **State University of New York at Stonybrook:** “Precision Measurement of the Weak Mixing Angle”, 1990.
- **University of Lausanne:** “Neutrino Determination of the Weak Mixing Angle and the Mass of the Top Quark”, 1993.
- **University of Munich:** “Beautiful Physics using High Energy Neutrinos”, 1996.
- **Virginia Tech at Blacksburg:** “Recent Results from the NOMAD Collaboration”, 1997.
- **University of Louvain:** “Precision Measurements of the Electroweak Parameters in the CCFR and NOMAD Experiments”, 1994.
- **University of Virginia (UVA):** “The Status of Neutrino Oscillation”, 1997.
- **University of Neuchatel:** “Signature of New Physics in Neutrino Experiments”, 1999.
- **Oxford University:** “Criteria for Establishing Neutrino Oscillation”, 2000.
- **CALTECH:** “High Sensitivity Search for $\nu_\mu \rightsquigarrow \nu_e$ Oscillation”, 2001.