Selected publications co-authored by Dr. Dhiman Chakraborty
(With a brief comment on special contribution to each.)

1. (Invited article) "Photon Detectors", D. Chakraborty, T. Sumiyoshi (for the Particle Data Group: `http://pdg.lbl.gov`): new section to be added to *Review of Particle Physics* starting with the 2006 issue. The project is funded by federal agencies worldwide. Biennial updates are published as a separate volume of Phys. Lett. B.

   Comment: Tens of thousands of copies of this benchmark reference book is distributed to physicists, teachers, and other interested readers around the globe. It contains up-to-date coverage of a wide range of topics including theory, experimental techniques, and results. Review of each topic is done by one or two experts, by invitation only.

2. (Invited article) "Review of Top Quark Physics", D. Chakraborty, J. Konigsberg, D.L. Rainwater, *Annual Review of Nuclear and Particle Sciences*, **53**, (2003); hep-ph/0303092.

   Comment: A dozen or so topics of highest interest to the particle and nuclear physicists are chosen each year (similar volumes are published for a several other disciplines of science as well). For each topic, up to three experts, recognized for their contributions to the study of that topic, are invited to write a detailed review (up to 50 pages).

3. "Small scintillating cells as the active elements in a digital hadron calorimeter for the e^+e^- linear collider" A. Dyshkant *et al.*, J. Phys. G. **30**, N1-N16 (2004),

   Comment: This is a pioneering work being done by the Experimental High Energy Physics group at NIU, simultaneously with and independently of a group in Europe. The work, which has drawn praise in peer review and attracted healthy federal funding, is widely considered the strongest candidates in a field of three. This hardware R&D, together with extensive simulation and development of pattern-recognition algorithms to make the best use of it forms a coherent research program that has been of the highest priority to the group since 2002.

4. "Investigation of a Solid-state Photodetector", D. Beznosko *et al.*, Nucl. Instr. and Methods **A545**, 727 (2005).

   Comment: A particular kind of Solid-state Photodetectors, called "Silicon PhotoMultipliers" (SiPM), are a key component at the heart of the R&D program described above. Recent emergence of SiPMs has helped us overcome the many difficulties with other types of photon detectors that would have negated the viability of the scintillator option for the proposed ILC hadronic caloerimeter in the past. The detailed characterization performed by our group established that SiPMs can meet the stringent criteria required for the application, which, if chosen, will require a federal investment in excess of $100 million. Item #1 above is reflects the importance of this achievement.

5. "The DØ Detector", S. Abachi *et al.*, Nucl. Instrum. Methods Phys. Res. A**338**, 185 (1994); Fermilab-Pub-93/179-E.

Comment: I was involved in the commissioning and online monitoring of the Central Drift Chamber, which was a key component of the DØ detector in Run 1 (1991-1996). I also contributed to several aspects of calorimeter reconstruction software.

6. "Search for the Top Quark in $\overline{p}p$ Collisions at $\sqrt{s} = 1.8$ TeV", S. Abachi *et al.*, Phys. Rev. Lett. **72**, 2138 (1994); Fermilab-Pub-94/004-E.

   Comment: My thesis research forms a large part of this paper.

7. "Rapidity Gaps between Jets in $\overline{p}p$ Collisions at $\sqrt{s} = 1.8$ TeV", S. Abachi *et al.*, Phys. Rev. Lett. **72**, 2332 (1994); Fermilab-Pub-94/005-E. Comment: I chaired the editorial board for this paper. (An *editorial board* is an internal review committee appointed by the spokespersons to guide each DØanalysis from its initial working group acceptance through full collaboration review.)

8. "Search for High Mass Top Quark Production in $\overline{p}p$ Collisions at $\sqrt{s} = 1.8$ TeV", S. Abachi *et al.*, Phys. Rev. Lett. **74**, 2422 (1995); Fermilab-Pub-94/354-E.

   Comment: My thesis research forms a large part of this paper.

9. "Observation of the Top Quark", S. Abachi *et al.*, Phys Rev. Lett. **74**, 2632 (1995); Fermilab-Pub-95/028-E.

   Comment: This paper, an important milestone in High Energy Physics, draws heavily on the continuation of my thesis research.

10. "A Study of the Strong Coupling Constant Using W + Jets Processes", S. Abachi *et al.*, Phys. Rev. Lett. **75**, 3226 (1995); Fermilab-Pub-95/085-E.

    Comment: I studied these processes in detail as they were the most serious background to my signal. I was in charge of porting and tuning the simulation program used to model these processes, and for producing large samples of such simulated events for the entire collaboration.

11. "Top Quark Search with the DØ 1992 – 93 Data Sample", S. Abachi *et al.*, Phys. Rev. D**52**, 4877 (1995); Fermilab-Pub-95/020-E.

    Comment: This is a more detailed version of the "search" letters listed above.

12. "Search for Light Top Squarks in $\overline{p}p$ Collisions at 1.8 TeV", S. Abachi *et al.*, Phys. Rev. Lett. **76**, 2222 (1996); Fermilab-Pub-95/380-E.

    Comment: I led the working group that oversaw this analysis and a few others (see below).

13. "Direct Measurement of the Top Quark Mass", S. Abachi *et al.*, Phys. Rev. Lett. **79**, 1197 (1997); Fermilab-Pub-97/059-E; hep-ex/9703008.

    Comment: I contributed to background modeling and finding discriminators to optimize signal significance.

14. "Measurement of the Top Quark Pair Production Cross Section in ppbar Collisions", S. Abachi *et al.*, Phys. Rev. Lett. **79**, 1203 (1997); Fermilab-Pub-97/109-E; hep-ex/9704015.

Comment: This is a continuation of the "observation" work listed above. The result is improved by using a larger volume of data and more refined analysis techniques.

15. "Measurement of the Top Quark Mass Using Dilepton Events", B. Abbott *et al.*, Phys. Rev. Lett. **80**, 2063 (1998); Fermilab-Pub-97/172-E; hep-ex/9706014.

    Comment: I contributed to background modeling.

16. "Direct measurement of the top quark mass by the DØ Collaboration", B. Abbott *et al.*, Phys. Rev. D **58**, 052001 (1998); Fermilab-Pub-98/031-E; hep-ex/9801025.

    Comment: This is a more detailed version of the first "top mass" letter listed above.

17. "Search for charged Higgs bosons in decays of top quark pairs", B. Abbott *et al.*, Phys. Rev. Lett. **82**, 4975 (1999); Fermilab-Pub-99/029-E; hep-ex/9902028.

    Comment: I performed this analysis. Also led the working group that oversaw this analysis and a few others.

18. "Spin Correlation in $t\bar{t}$ Production from $p\bar{p}$ Collisions at $\sqrt{s} = 1800$ GeV", B. Abbott *et al.*, Phys. Rev. Lett. **85**, 256 (2000), Fermilab-Pub-00/046-E, hep-ex/0002058.

    Comment: I led the working group that oversaw this analysis.

19. "Search for Electroweak Production of Single Top Quarks in pbarp Collisions", B. Abbott *et al.*, Phys. Rev. D Rapid Comm. **63** 031101 (2001); Fermilab-Pub-00/188-E, hep-ex/000824.

    Comment: I led the working group that oversaw this analysis.

20. "Direct Search for Charged Higgs Bosons in Decays of Top Quarks", V. M. Abazov *et al.*, Phys. Rev. Lett. **88**, 151803 (2002); FERMILAB-Pub-01/022-E; hep-ex/0102039.

    Comment: I performed this analysis together with a graduate student. Also led the working group that oversaw this analysis.

21. "$t\bar{t}$ production cross section in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV", V. M. Abazov *et al.*, Phys. Rev. D **67**, 012004 (2003); hep-ex/0205019.

    Comment: My thesis analysis and its continuation formed an important part of this final paper on the Run 1 "cross section" series.

22. "Search for Narrow $t\bar{t}$ Resonances in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV", V. M. Abazov *et al.*, Phys. Rev. Lett. **92**, 221801 (2004); hep-ex/0307079.

    Comment: I worked closely with the graduate student who was the primary author. Also led the working group that oversaw this analysis.

23. "Improved Measurement of the Top Quark Mass", V. M. Abazov *et al.*, Nature **429**, 638 (2004); hep-ex/0406031, FERMILAB-Pub-04/083-E..

    Comment: I led the working group that oversaw the initial phase of this analysis, one of the most important from DØ.

24. "Helicity of the W Boson in Lepton + Jets $t\bar{t}$ Events", V. M. Abazov *et al.*, Phys. Lett. B **617**, 1 (2005); hep-ex/0404040; FERMILAB-Pub-04/057-E.

    Comment: I led the working group that oversaw the initial phase this analysis.

25. "Measurement of the Top Quark Mass in Alljets Events", V. M. Abazov *et al.*, Phys. Lett. B **606**, 25 (2005); hep-ex/0410086; FERMILAB-Pub-04-305-E.

    Comment: I led the working group that oversaw the initial phase this analysis. Also chaired the editorial board.

26. "First measurement of $\sigma(p\bar{p} \to Z)B(Z \to \tau\tau)$ at $\sqrt{s} = 1.96$ TeV", V. M. Abazov *et al.*, Phys. Rev. D **71**, 072004 (2005); hep-ex/0412020; FERMILAB-Pub-04-381-E.

    Comment: From 2001 to 2005 I co-led the τ particle identification group at DØ, which made this first measurement of its kind from the Tevatron possible. I also introduced the use of artificial neural networks for τ identification, which forms the basis of this analysis.

27. "Measurement of the $t\bar{t}$ cross section in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV using kinematic characteristics of lepton plus jet events", V. M. Abazov *et al.*, Phys. Lett. B **626**, 45 (2005); hep-ex/0504043, Fermilab-Pub-05/079-E.

    Comment: This is an extension of my thesis research. Presently I am a member of the editorial board for this analysis.

28. "The Upgraded DØ Detector", V. M. Abazov *et al.*, submitted to Nucl. Instr. and Methods, hep-physics/0507191, Fermilab-Pub-05/341-E. Comment: I contributed to the design of the Forward Preshower Detector, an important component of the DØ detector upgrade for Run 2.

29. "Search for Neutral Higgs Bosons Decaying to tau pairs in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV", V. M. Abazov *et al.*, submitted to Phys. Rev. Lett. (2006); hep-ex/0605009; Fermilab-Pub-06/092-E.

    Comment: Same as the $\sigma(p\bar{p} \to Z)B(Z \to \tau\tau)$ paper above.