Curriculum Vitæ
Brett van de Sande

February 21, 2019

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Date of Birth: November 2, 1965
Citizenship: USA

Education

California Institute of Technology, B. S. (Physics), 1988.

The Ohio State University, Ph.D. (Physics), 1994.

Awards and Grants

Westinghouse Science Talent Search Finalist, 1984.

Von Humboldt Fellowship, 1994–1996.

Cottrell College Science Award, The Research Corporation, 2000–2001.

National Science Foundation Grant, Award No. PHY-0200060, 2002–2005.

James Chen Award for best paper (with K. Muldner, W. Burlson, & K. VanLehn) in the 2011 volume of the journal User Modeling and User Adapted Interaction.

Professional Experience

U. S. Army Electronics Technology and Devices Lab, Ft. Monmouth, N. J.
1983–1984 Microwave vacuum tube design and testing.
1985–1987 Theoretical studies of quantum transport in semiconductors.

Caltech, Department of Physics
1985–1987 BGO scintillator calibration for L3 at LEP.

Oak Ridge National Lab, Health and Safety Research Division
1988 Laser Optics and techniques Spectroscopy and Scanning Tunneling Microscopy.

University of Pennsylvania, Department of Physics
1988–1989 Room temperature liquid calorimetry for use at the SSC.

Ohio State University, Department of Physics
1989–1990 Deep-inelastic scattering and charm mass measurement.
1991–1994 Graduate Research Assistant, Light-front field theory.

Max Planck Institut für Kernphysik, Heidelberg, Germany
1994–1996 Post-doctoral Associate, Light-front field theory.

Universität Erlangen-Nürnberg, Erlangen, Germany
1996–1999 Post-doctoral Associate, Light-front field theory.

Geneva College, Beaver Falls, PA
1999–2004 Assistant Professor, Physics and Mathematics.

University of Pittsburgh, Pittsburgh, PA
2005–2008 Research Associate, Physics Education

Arizona State University, Tempe, AZ
2008–2014 Research Professional, Physics Education

Pearson Education
2013–2014 Consultant, Educational Data Mining
2014–2018 Research/Data Scientist

Teaching Experience

Ohio State University, Department of Physics
1989–1990 Recitation instructor for introductory courses (131 and 132).
1990–1991 Recitation instructor for introductory lab (131).
1992 Grader for graduate courses (829 and 880.20).

Universität Erlangen-Nürnberg
1996–1997 Recitation instructor for statistical mechanics and introductory mechanics.
1997–1998 Recitation instructor for quantum mechanics.
1998–1999 Recitation instructor for electricity and magnetism.

Geneva College
1999–2000 Lectures: Introductory Physics, Numerical Methods, and Calculus. Introductory Physics lab instructor.
2000–2001 Lectures: Introductory Physics, Classical Mechanics, Quantum Mechanics, and Numerical Methods. Introductory Physics lab instructor.
2001–2002 Lectures: Introductory Physics, Abstract Algebra, Quantum Mechanics, and Numerical Methods. Introductory Physics lab instructor.
2002–2003 Lectures: Introductory Physics, Remedial Algebra, Linear Algebra, Abstract Algebra, and Quantum Mechanics. Introductory Physics lab instructor.
2003–2004 Lectures: Introductory Physics, Remedial Algebra, and Differential Equations. Introductory Physics lab instructor.

Thesis Supervision

Loren Silbaugh, Indiana University of Pennsylvania, M. S. in applied math, 2007.

Journal articles and conference proceedings with stringent review

G. C. Wetsel, S. E. McBride, R. J. Warmack, & **B. van de Sande**, "Calibration of Scanning-Tunneling-Microscope Transducers Using Optical Beam Deflection," Appl. Phys. Lett. **55**, 528 (1989).

B. van de Sande & S. Pinsky, "Renormalization of Tamm-Dancoff Integral Equations," Phys. Rev. D **46**, 5479 (1992).

C. Bender, S. Pinsky, & **B. van de Sande**, "Spontaneous symmetry breaking of (1+1)-dimensional ϕ^4 theory in light-front field theory," Phys. Rev. D **48**, 816 (1993).

S. Pinsky & **B. van de Sande**, "Spontaneous symmetry breaking of (1+1)-dimensional ϕ^4 theory in light-front field theory (II)," Phys. Rev. D **49**, 2001 (1994).

S. Pinsky, **B. van de Sande**, & J. Hiller, "Spontaneous symmetry breaking of (1+1)-dimensional ϕ^4 theory in light-front field theory (III)," Phys. Rev. D **51**, 726 (1995).

B. van de Sande & M. Burkardt, "Tube Model for Light-Front QCD," Phys. Rev. D **53**, 4628 (1996).

B. van de Sande, "Convergence of discretized light cone quantization in the small mass limit," Phys. Rev. D **54**, 6347 (1996).

S. Dalley & **B. van de Sande**, "Colour-dielectric gauge theory on a transverse lattice," Phys. Rev. D **56**, 7917 (1997).

S. Dalley & **B. van de Sande**, "Transverse Lattice Approach to Light-Front Hamiltonian QCD," Phys. Rev. D **59**, 065008 (1999).

S. Dalley & **B. van de Sande**, "Glueball calculations in large-N_c gauge theory," Phys. Rev. Lett. **82**, 1088 (1999).

S. Dalley & **B. van de Sande**, "Glueballs on a transverse lattice," Phys. Rev. D **62**, 014507 (2000).

S. Dalley & **B. van de Sande**, "Study of large-N Yang-Mills theory in (2+1)-dimensions," Phys. Rev. D **63**, 076004 (2001).

S. Dalley & **B. van de Sande**, "Transverse lattice calculation of the pion light-cone wavefunctions," Phys. Rev. D **67**, 114507 (2003).

J. Bratt, S. Dalley, **B. van de Sande**, & E. M. Watson, "Small-x behaviour of lightcone wavefunctions in transverse lattice gauge theory," Phys. Rev. D **70**, 114502 (2004).

S. Dalley & **B. van de Sande**, "Finite temperature gauge theory from the transverse lattice," Phys. Rev. Lett. **95**, 162001 (2005).

R. G. M. Hausmann, **B. van de Sande**, & K. VanLehn, "Trialog: How Peer Collaboration Helps Remediate Errors in an ITS," in "Proceedings of the 21th International FLAIRS Conference," Menlo Park: CA, AAAI Press, 415–420 (2008).

R. G. M. Hausmann, **B. Van de Sande**, & K. VanLehn, "Are self-explaining and coached problem solving more effective when done by pairs of students than alone?" In B. C. Love, K. McRae & V. M. Sloutsky (Eds.), "Proceedings of the 30th Annual Conference of the Cognitive Science Society," Austin, TX: Cognitive Science Society, 2369–2374 (2008).

R. G. M. Hausmann, **B. Van de Sande**, & K. VanLehn, "Shall we explain? Augmenting learning from intelligent tutoring systems and peer collaboration," in B. P. Woolf, E. Aimeur, R. Nkambou & S. Lajoie (Eds.), "Intelligent Tutoring Systems" Berlin: Springer-Verlag, 636–645 (2008).

R. G. M. Hausmann, **B. van de Sande**, C. van de Sande, & K. VanLehn, "Productive dialog during collaborative problem solving," in P. A. Kirschner, F. Prins, V. Jonker & G. Kanselaar (Eds.), "Proceedings of the Eighth International Conference for the Learning Sciences – ICLS 2008," Vol. 1. The Netherlands: ISLS, 327–334 (2008).

R. G. M. Hausmann, T. J. Nokes, K. VanLehn, & **B. van de Sande**, "Collaborative dialog while studying worked-out examples," in V. Dimitrova, R. Mizoguchi, B. Du Boulay & A. C. Graesser (Eds.), "Artificial Intelligence in Education." Amsterdam, Netherlands: IOS Press (2009).

R. G. M. Hausmann, T. J. Nokes, K. VanLehn, **B. van de Sande**, & S. Gershman, "The design of self-explanation prompts: The Fit hypothesis," in N. Taatgen & H. van Rijn (Eds) "CogSci 2009 Proceedings." (2009).

K. Muldner, W. Burleson, **B. van de Sande**, & K. VanLehn, "An analysis of gaming behaviors in an intelligent tutoring system," in V. Aleven, J. Kay & J. Mostow (Eds), "Intelligent Tutoring Systems: 10th International Conference, ITS 2010." Heidelberg, Germany: Springer, 224–233 (2010).

K. Muldner, W. Burleson, **B. van de Sande**, & K. VanLehn, "An analysis of students' gaming behaviors in an intelligent tutoring system: Predictors and impacts," in "User Modeling and User Adapted Instruction, 21," 1–2, 99–135 (2011).

B. van de Sande, "Properties of the bayesian knowledge tracing model," Journal of Educational Data Mining 5 (2), 1–10 (2013).

B. van de Sande, "Applying three models of learning to individual student log data," in S. K. D'Mello, R. A. Calvo, A. and Olney (Eds.), "Proceedings of the 6th International Conference on Educational Data Mining," 193–199 (2013).

B. van de Sande, "Measuring the moment of learning with an information-theoretic approach," in S. K. D'Mello, R. A. Calvo, A. and Olney (Eds.), "Proceedings of the 6th International Conference on Educational Data Mining," 288–291 (2013).

R. Ranganathan, **B van de Sande**, & K. VanLehn, "What do students do when using a step-based tutoring system," Research and Practice in Technology Enhanced Learning 9 (2), 323–347 (2014).

B. van de Sande, "Learning Curves for Problems with Multiple Knowledge Components" in T. Barnes, M. Chi, & M. Feng (Eds.), "Proceedings of the 9th International

Conference on Educational Data Mining," 523–526 (2016).

B. van de Sande, "Learning curves versus problem difficulty: an analysis of the Knowledge Component picture for a given context" in T. Barnes, M. Chi, & M. Feng (Eds.), "Proceedings of the 9th International Conference on Educational Data Mining," 646–647 (2016).

K. VanLehn, J. Wetzel, S Grover, & **B van de Sande**, "Learning How to Construct Models of Dynamic Systems: An Initial Evaluation of the Dragoon Intelligent Tutoring System," IEEE Transactions on Learning Technologies, 10(2), 154–167 (2017).

J. Wetzel, K. VanLehn, et al. "The Design and Development of the Dragoon Intelligent Tutoring System for Model Construction: Lessons Learned," Interactive Learning Environments 25 (3), 361–381 (2017).

Conference proceedings and book chapters with less stringent review

B. van de Sande, "Spontaneous symmetry breaking in light-front field theory," in "Theory of Hadrons and Light-Front QCD," Stanisław Głazek, ed., World Scientific, 1995.

S. Dalley & **B. van de Sande**, "Transverse lattice QCD in 2+1 dimensions," in "Lattice '96," Nucl. Phys. Proc. Suppl. **53**, 827 (1997).

B. van de Sande & S. Dalley, "The transverse lattice in 2+1 dimensions," in "Neutrino Mass, Dark Matter, Gravitational Waves, Monopole Condensation, and Light Cone Quantization," edited by B. N. Kursunoglu, et al. (Plenum, New York, 1996), 223–240.

S. Dalley & **B. van de Sande**, "Color-dielectric gauge theory on a transverse lattice," in "New Non Perturbative Methods and Quantization on the Light Cone" Les Houches Series Vol. 8 (1997) Editions De Physique/Springer Verlag Editors.

S. Dalley & **B. van de Sande**, "'Light cone QCD calculations on the lattice," Nucl. Phys. B **83** (Proc. Suppl.), 116 (2000).

S. Dalley & **B. van de Sande**, "Transverse lattice QCD," in "Light-cone QCD and Nonperturbative Hadron Physics," edited by A.W. Schreiber & A.G. Williams (World Scientific, Singapore, 2000), 42–50.

R. G. M. Hausmann, **B. van de Sande**, & K. VanLehn, "The content of self-explanations while studying incomplete worked-out examples," in B. C. Love, K. McRae & V. M. Sloutsky (Eds.), "Proceedings of the 30th Annual Conference of the Cognitive Science Society." New York, NY: Erlbaum, 1680 (2008).

K. VanLehn & **B. van de Sande**, "Acquiring conceptual expertise from modeling: The case of elementary physics," in K. A. Ericsson (Ed.) "The Development of Professional Performance: Toward Measurement of Expert Performance and Design

of Optimal Learning Environments." Cambridge, UK: Cambridge University Press, 356–378 (2009).

K. VanLehn, **B. van de Sande**, R. Shelby, & S. Gershman, "The Andes physics tutoring system: An experiment in freedom," in R. Nkambou & J. Bourdeau (Eds.) "Advances in Intelligent Tutoring Systems." Berlin: Springer-Verlag, 421–446 (2010).

Patents and unpublished reports

"Beam Neutralization of the RFQ at LEP/L3," October 1986.

H. L. Berkowitz, R. A. Lux, & **B. van de Sande**, "Self-Consistent Simulation of Charge Transport in Heterojunction Resonant Tunnelling Diodes," presented at the NUMOS conference, Pasadena, CA, December 12, 1986.

"Free Electron Diode Oscillator," U. S. Patent No. 4,668,924, May 26, 1987.