

## Curriculum Vitæ

---

**John Laiho** Syracuse University Phone: (315) 443-3901  
 Syracuse, NY, USA 13244  
 Fax: (315) 443-9103 Email: jwlaiho@syr.edu

---

### Education

June 2004 Ph.D. in Physics, Princeton University.  
 Dissertation Thesis: Lattice determination of kaon matrix elements.  
 Dissertation Advisor: Dr. Amarjit Soni, BNL.  
 May 1998 B.A. in Physics and Mathematics, *summa cum laude*,  
 Rhode Island College, Providence, RI.

---

### Academic Honors and Awards

May 1998 Eleanor McMahon Award, Rhode Island College  
 Physical Sciences Award, Rhode Island College  
 Mathematics Award, Rhode Island College

---

### Research Interests

Lattice QCD, Flavor Physics and CP violation, Chiral Perturbation Theory, Lattice Gravity.

---

### Professional Experience

Jan 2013 - Assistant Professor, Syracuse University  
 Oct 2009 - Dec 2012 Lecturer, University of Glasgow  
 Sept 2007 - Sept 2009 Research Associate, Washington University in St. Louis  
 Sept 2004 - Aug 2007 Research Associate, Fermilab  
 Sept 2003 - July 2004 Research Grant, Brookhaven National Laboratory  
 Sept 2000 - May 2003 Teaching Assistant, Princeton University.  
 Jun 1999 - Aug 2000 Research Assistant, Princeton University.

---

### Publications and Proceedings

- A. Bazavov, *et. al.*, “Determination of  $|V_{us}|$  from a lattice-QCD calculation of the  $K \rightarrow \pi l \nu$  semileptonic form factor with physical quark masses”, Accepted by Phys. Rev. Lett. [arXiv:1312.1228]
- S.W. Qiu, *et. al.*, “Semileptonic decays  $B \rightarrow D^{(*)} l \nu$  at nonzero recoil”, 31st International Symposium on Lattice Field Theory (Lattice 2013), Mainz, Germany, Jul 29-Aug 3, 2013 [arXiv:1312.0155]
- A. Bazavov, *et. al.*, “Charmed and strange pseudoscalar meson decay constants from HISQ simulations”, 31st International Symposium on Lat-

tice Field Theory (Lattice 2013), Mainz, Germany, Jul 29-Aug 3, 2013 [arXiv:1312.0149]

- E. Gamiz, *et. al.*, “*K semileptonic form factor with HISQ fermions at the physical point*”, 31st International Symposium on Lattice Field Theory (Lattice 2013), Mainz, Germany, Jul 29-Aug 3, 2013 [arXiv:1311.7264]
- C. C. Chang, *et. al.*, “*Matrix Elements for D- and B-Mixing from 2+1 Flavor Lattice QCD*”, 31st International Symposium on Lattice Field Theory (Lattice 2013), Mainz, Germany, Jul 29-Aug 3, 2013 [arXiv:1311.6820]
- D. Du, *et. al.*, “*B → πℓν and B → πℓ<sup>+</sup>ℓ<sup>-</sup> semileptonic form factors from unquenched lattice QCD*”, 31st International Symposium on Lattice Field Theory (Lattice 2013), Mainz, Germany, Jul 29-Aug 3, 2013 [arXiv:1311.6552]
- J. Laiho, “*Lattice QCD and Kaon Physics*”, 2013 Kaon Physics International Conference (Kaon 2013), Ann Arbor, MI, USA, Apr 29-May 1, 2013
- S. Aoki, *et. al.*, “*Review of lattice results concerning low energy particle physics*”, [arXiv:1310.8555]
- A. Bazavov, *et. al.*, “*Leptonic decay-constant ratio  $f_{K^+}/f_{\pi^+}$  from lattice QCD with physical light quarks*”, Phys. Rev. Lett. **110**:172003, [arXiv:1301.5855]
- A. Bazavov, *et. al.*, “*Kaon semileptonic vector form factor and determination of  $|V_{us}|$  using staggered fermions*”, Phys. Rev. D **87**:073012, [arXiv:1212.4993]
- A. Bazavov, *et. al.*, “*Lattice QCD ensembles with four flavors of highly improved staggered quarks*”, Phys. Rev. D **87**:054505, [arXiv:1212.4768]
- J. Beringer, *et. al.*, “*Review of Particle Physics*”, Phys. Rev. D **86**:010001 (2012)
- J. A. Bailey, *et. al.*, “*Refining new-physics searches in  $B \rightarrow D\tau\nu$  decay with lattice QCD*”, Phys. Rev. Lett. **109**:071802, [arXiv:1206.4992]
- J. A. Bailey, *et. al.*, “ *$B_s \rightarrow D_s/B \rightarrow D$  semileptonic form-factor ratios and their application to  $BR(B_s^0 \rightarrow \mu^+\mu^-)$* ”, Phys. Rev. D **85**:114502, Erratum-ibid. D **86** (2012):039904 [arXiv:1202.6346]
- D. Coumbe and J. Laiho, “*Exploring the phase diagram of Lattice Quantum Gravity*”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1201.2864]

- C. Bouchard, *et. al.*, “Neutral  $B$  mixing from 2+1 flavor Lattice QCD: the Standard Model and beyond”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1112.5642]
- J. Laiho and R. S. Van de Water, “Pseudoscalar decay constants, light-quark masses, and  $B_K$  from mixed-action lattice QCD”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1112.4861]
- E. Neil, *et. al.*, “ $B$  and  $D$  meson decay constants from 2+1 flavor improved staggered simulations”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1112.3978]
- A. Bazavov, *et. al.*, “ $B$ - and  $D$ -meson decay constants from three-flavor lattice QCD”, Phys. Rev. D **85**:114506 (2012) [arXiv:1112.3051]
- A. Bazavov, *et. al.*, “Properties of light pseudoscalars from Lattice QCD with HISQ ensembles”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011
- C. Bernard, *et. al.*, “ $B$  mixing in the Standard Model and beyond: Lattice QCD”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1111.2968]
- D. Du, *et. al.*, “Semileptonic form factor ratio  $B_s \rightarrow D_s/B \rightarrow D$  and its application to  $BR(B^0 \rightarrow \mu^+ \mu^-)$ ”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1111.1796]
- S. Qiu, *et. al.*, “Semileptonic  $B$  to  $D$  decay constants at nonzero recoil with 2+1 flavors of improved staggered quarks”, 29th International Symposium on Lattice Field Theory (Lattice 2011), Squaw Valley, CA, USA, Jul 10-16, 2011 [arXiv:1111.0677]
- J. Laiho, B. D. Pecjak, C. Schwanda, “CKM2010 Working Group II Summary”, CKM 2010, Warwick, UK, September 10, 2010 [arXiv:1107.3934]
- J. Laiho, “Light quark physics from lattice QCD”, plenary talk given at 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1106.0457]
- J. Laiho and D. Coumbe, “Evidence for Asymptotic Safety from Lattice Quantum Gravity”, Phys. Rev. Lett. **107**:161301 (2011) [arXiv:1104.5505]
- J. Laiho, E. Lunghi, R. S. Van de Water, “Lessons for new physics from CKM studies”, FPCP 2010, Torino, Italy, May 28, 2010 [arXiv:1102.3917]

- A. Torok, *et. al.*, “*Electromagnetic splitting of charged and neutral mesons*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010
- J. Simone, *et. al.*, “*The decay constants  $f_{D_s}$ ,  $f_{D^+}$ ,  $f_{B_s}$  and  $f_B$  from lattice QCD*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010
- A. Bazavov, *et. al.*, “*Simulations with dynamical HISQ quarks*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1012.1265]
- A. Bazavov, *et. al.*, “*Results for light pseudoscalar mesons*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1012.0868]
- J. Laiho and R. S. Van de Water, “ *$K \rightarrow \pi\pi$  matrix elements from mixed action lattice QCD*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1011.4524]
- J. A. Bailey, *et. al.*, “*Semileptonic decays of  $K$  and  $D$  mesons in 2+1 flavor QCD*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1011.2423]
- J. A. Bailey, *et. al.*, “ *$B \rightarrow D^* \ell \nu$  at zero recoil: an update*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1011.2166]
- A. Bazavov, *et. al.*, “*Staggered chiral perturbation theory in the two-flavor case and  $SU(2)$  analysis of the MILC data*”, 28th International Symposium on Lattice Field Theory (Lattice 2010), Villasimius, Italy, Jul 14-19, 2010 [arXiv:1011.1792]
- A. Bazavov, *et. al.*, “*Scaling studies of QCD with the dynamical HISQ action*”, Phys. Rev. D **82**:074501 (2010) [arXiv:1004.0342]
- A. Bazavov, *et. al.*, “*Topological susceptibility with the asqtad action*”, Phys. Rev. D **81**:114501 (2010) [arXiv:1003.5695]
- C. Benard, *et al.*, “*Tuning Fermilab heavy quarks in 2+1 flavor lattice QCD with application to hyperfine splittings*”, Phys. Rev. D **83**:034503 (2011) [arXiv:1003.1937]
- A. Bazavov, *et al.*, “*The  $D_s$  and  $D^+$  leptonic decay constants from lattice QCD*”, 27th International Symposium on Lattice Field Theory (Lattice 2009), Peking University, Beijing, China, Jul 26-31 2009. [arXiv:0912.5221]
- J. A. Bailey, *et al.*, “*Progress on charm semileptonic form factors from 2+1 flavor lattice QCD*”, 27th International Symposium on Lattice Field Theory (Lattice 2009), Peking University, Beijing, China, Jul 26-31 2009. [arXiv:0912.0214]

- A. Bazavov, *et al.*, “*Progress on four flavor QCD with the HISQ action*”, 27th International Symposium on Lattice Field Theory (Lattice 2009), Peking University, Beijing, China, Jul 26-31 2009. [arXiv:0911.0869]
- A. Bazavov, *et al.*, “*SU(2) chiral fits to light pseudoscalar masses and decay constants*”, 27th International Symposium on Lattice Field Theory (Lattice 2009), Peking University, Beijing, China, Jul 26-31 2009. [arXiv:0911.0472]
- A. Bazavov, *et al.*, “*Results from the MILC collaboration’s SU(3) chiral perturbation theory analysis*”, 27th International Symposium on Lattice Field Theory (Lattice 2009), Peking University, Beijing, China, Jul 26-31 2009. [arXiv:0910.3618]
- J. Laiho, E. Lunghi, R. S. Van de Water, “*Lattice QCD inputs to the CKM unitarity triangle analysis*”, Phys. Rev. D **81**:034503, (2010) [arXiv:0910.2928]
- M. Antonelli, *et al.*, “*Flavor Physics in the Quark Sector*”, Phys. Rept. **494**:197-414, 2010 [arXiv:0907.5386]
- C. Bernard, *et al.*, “*Visualization of semileptonic form factors from lattice QCD*”, Phys. Rev. D **80**:034026, (2009) [arXiv:0906.2498]
- C. Aubin, J. Laiho, and R. S. Van de Water, “*The neutral kaon mixing parameter  $B_K$  from unquenched mixed-action lattice QCD*”, Phys. Rev. D **81**:014507, (2010) [arXiv:0905.3947]
- A. Bazavov, *et al.*, “*Nonperturbative QCD simulations with 2 + 1 flavors of improved staggered quarks*”, Rev. Mod. Phys. **82**:1349-1417, (2010) [arXiv:0903.3598]
- C. Bernard, *et al.*, “*B and D Meson Decay Constants*”, 26th International Symposium on Lattice Field Theory (Lattice 2008), Williamsburg, Virginia, USA, Jul 14-19 2008. [arXiv:0904.1895]
- A. Bazavov, *et al.*, “*HISQ action in dynamical simulations*”, 26th International Symposium on Lattice Field Theory (Lattice 2008), Williamsburg, Virginia, USA, Jul 14-19 2008. [arXiv:0903.0874]
- S. Basak, *et al.*, “*Electromagnetic splittings of hadrons from improved staggered quarks in full QCD*”, 26th International Symposium on Lattice Field Theory (Lattice 2008), Williamsburg, Virginia, USA, Jul 14-19 2008. [arXiv:0812.4486]
- J. Bailey, *et al.*, “*The  $B \rightarrow \pi \ell \nu$  semileptonic form factor and  $|V_{ub}|$  from unquenched lattice QCD*”, Phys. Rev. D **79**:054507, (2009) [arXiv:0811.3640]

- C. Aubin, J. Laiho, and R. S. Van de Water, “*Light pseudoscalar masses and decay constants with a mixed action*”, 26th International Symposium on Lattice Field Theory (Lattice 2008), Williamsburg, Virginia, USA, Jul 14-19 2008. [arXiv:0810.4328]
- C. Bernard, *et al.*, “*The  $\bar{B} \rightarrow D^* \ell \bar{\nu}$  form factor at zero recoil from 2+1 flavor lattice QCD: A model independent determination of  $|V_{cb}|$* ”, Phys. Rev. D **79**:014506, (2009) [arXiv:0808.2519]
- C. Aubin, J. Laiho, S. Li, and M. Lin, “ *$K \rightarrow \pi$  and  $K \rightarrow 0$  in 2+1 flavor partially quenched chiral perturbation theory*”, Phys. Rev. D **78**:094505, (2008) [arXiv:0808.3264]
- C. Aubin, J. Laiho, and R. S. Van de Water, “*Discretization effects and the scalar meson correlator in mixed action lattice simulations*”, Phys. Rev. D **77**:114501, (2008) [arXiv:0803.0129]
- C. Bernard *et al.* [Fermilab Lattice, MILC and HPQCD Collaborations], “*The decay constants  $f_B$  and  $f_{D^*}$  from three-flavor lattice QCD*”, 25th International Symposium on Lattice Field Theory (Lattice 2007), Regensburg, Germany, Jul 30-Aug 4 2007, PoS **LAT2007**, 370 (2007).
- C. Aubin, J. Laiho, and R. S. Van de Water, “*The kaon  $B$ -parameter from unquenched mixed action lattice QCD*”, 25th International Symposium on Lattice Field Theory (Lattice 2007), Regensburg, Germany, Jul 30-Aug 4 2007. [arXiv:0710.1121]
- J. Laiho, “ *$\bar{B} \rightarrow D^* \ell \bar{\nu}$  with 2+1 flavors*”, 25th International Symposium on Lattice Field Theory (Lattice 2007), Regensburg, Germany, Jul 30-Aug 4 2007. [arXiv:0710.1111]
- C. Aubin, J. Laiho, and R. S. Van de Water, “*Taste violations in the scalar correlator in mixed action simulations*”, 25th International Symposium on Lattice Field Theory (Lattice 2007), Regensburg, Germany, Jul 30-Aug 4 2007. [arXiv:0710.0804]
- C. Aubin, J. Laiho, and R. S. Van de Water, “*The kaon  $B$ -parameter in mixed action chiral perturbation theory*”, Phys. Rev. D **75**:034502, (2007) [hep-lat/0609009]
- C. Aubin, *et al.*, “*Systematic effects of the quenched approximation on the strong penguin contribution to  $\varepsilon'/\varepsilon$* ”, Phys. Rev. D **74**:034510, (2006) [hep-lat/0603025]
- J. Laiho and R. S. Van de Water, “ *$B \rightarrow D^* \ell \nu$  and  $B \rightarrow D \ell \nu$  form factors in staggered chiral perturbation theory*”, Phys. Rev. D **73**:054501, (2006) [hep-lat/0512007]
- Y. Aoki, *et al.*, “*Lattice QCD with two dynamical flavors of domain wall quarks*”, Phys. Rev. D **72**:114505, (2005) [hep-lat/0411006]

- J. Laiho “*Quenching effects in strong penguin contributions to  $\varepsilon'/\varepsilon$* ”, Lattice 2004, Fermilab, June 21-26, 2004. [hep-lat/0409113]
- J. Laiho “*Lattice Extraction of  $\varepsilon'/\varepsilon$  using Partially Quenched Chiral Perturbation Theory*”, 21st International Symposium on Lattice Field Theory (Lattice 2003), Tsukuba, Ibaraki, Japan, 15-19 Jul 2003. [hep-lat/0309140]
- J. Laiho, A. Soni, “*Lattice Extraction of  $K \rightarrow \pi\pi$  Amplitudes to NLO in Partially Quenched and in Full Chiral Perturbation Theory*”, Phys. Rev. D **71**:014021 (2005) [hep-lat/0306035]
- J. Laiho, A. Soni, “*Lattice Extraction of  $K \rightarrow \pi\pi$  to  $O(p^4)$  in Chiral Perturbation Theory*”, Phys. Rev. D **65**:114020 (2002). [hep-ph/0203106]
- D.G. Furton, J. Laiho, A.N. Witt, “*The Amount of Interstellar Carbon Locked in Solid Hydrogenated Amorphous Carbon*”, (1999). [astro-ph/9908035]

## Talks

- “*Lattice QCD and Quark Flavor Physics*”, Snowmass 2013, University of Minnesota, August 1, 2013
- “*Lattice QCD and Kaon Physics*”, (invited plenary) 2013 Kaon Physics International Conference, Ann Arbor, MI, USA, Apr 29, 2013
- “*Euclidean Dynamical Triangulations*”, CDT and friends Workshop, University of Nijmegen, Netherlands, Dec 11, 2012
- “*Lattice Quantum Gravity*”, Workshop on Strongly-Interacting Field Theories, University of Jena, Germany, Nov 30, 2012
- “*Lattice form factors and  $|V_{cb}|$* ”, CKM 2012, Cincinnati, Ohio, September 30, 2012
- “*Asymptotic Safety and Lattice Quantum Gravity*”, (invited plenary) Lattice 2011, Squaw Valley, California, July 11, 2011
- “*Working Group II Summary*”, (invited plenary) CKM 2010, Warwick, UK, September 10, 2010
- “*Light quark physics from lattice QCD*”, (invited plenary) Lattice 2010, Villasimius, Sardinia, Italy, June 19, 2010
- “*Lattice input to CKM measurements*”, (invited plenary) FPCP 2010, Torino, Italy, May 28, 2010
- “*Light quark results from a mixed lattice action*”, Chiral Dynamics 2009, University of Bern, Bern, Switzerland, July 9, 2009

- “*Form factors from lattice QCD*”, CIPANP 2009: Tenth Conference on the Intersections of Particle and Nuclear Physics, San Diego, California, May 29, 2009
- “*Determination of  $\mathcal{F}(1)$  and  $\mathcal{G}(1)$* ”, CKM 2008, Universita di Roma, Rome, Italy, September 10, 2008
- “*Semileptonic decays on the lattice*”, ICHEP 2008, University of Pennsylvania, Philadelphia, PA, July 30, 2008
- “*Light pseudoscalar masses and decay constants with a mixed action*”, Lattice 2008, College of William and Mary, Williamsburg, VA, July 15, 2008
- “*Standard Model parameters from MILC lattices*”, Workshop on perspectives and challenges for full QCD lattice calculations, ECT, Trento, Italy, May 8, 2008
- “*Overview and recent developments in form-factor calculations on the lattice for  $B \rightarrow D^* \ell \nu$  decays*”, Joint workshop on  $|V_{ub}|$  and  $|V_{cb}|$  at the B-factories, Heidelberg, Germany, December 14, 2007
- “*Charm B semileptonic decays*”, Lattice QCD meets experiment workshop 2007, Fermilab, Batavia, IL, December 10, 2007
- “ *$B \rightarrow D^* \ell \nu$  with 2+1 flavors*”, Lattice 2007, University of Regensburg, Regensburg, Germany, August 2, 2007
- “*Progress in lattice QCD: leptonic decays and neutral meson mixing*”, (invited plenary) FPCP 2007, Bled, Slovenia, May 15, 2007
- “*The  $B \rightarrow D^* \ell \nu$  form factor from lattice QCD*”, Lattice 2006, University of Arizona, Tucson, AZ, July 26, 2006
- “ *$B \rightarrow D^* \ell \nu$  in staggered chiral perturbation theory*”, Lattice 2005, Trinity College, Dublin, July 26, 2005
- “*Lattice Calculations of  $\epsilon'/\epsilon$* ”, (invited plenary) Kaon 2005 International Workshop, Northwestern University, June 15, 2005
- “*Chiral Perturbation Theory- connecting lattice results to experiment*”, APS Meeting, Tampa, FL, April 16, 2005
- “*Quenching effects in strong penguin contributions to  $\epsilon'/\epsilon$* ”, Lattice 2004, Fermilab, June 22, 2004
- “*Lattice Extraction of  $\epsilon'/\epsilon$  using (PQ) Chiral Perturbation Theory*”, Lattice 2003, 21st International Symposium on Lattice Field Theory, Tsukuba, Ibaraki, Japan, July 15, 2003
- “*Lattice Extraction of  $\epsilon'/\epsilon$  using Chiral Perturbation Theory*”, CIPANP 2003, Conference on Intersections of Particle and Nuclear Physics, New York City, New York, May 23, 2003