

## BIOGRAPHICAL SKETCH - SIMONETTA LIUTI

### i. Professional Preparation

University of Perugia	Physics Laurea, 1984	Adviser: B.A. de Tollis
University of Rome "La Sapienza"	Physics Ph.D., 1989	Adviser: C. Ciofi degli Atti

### ii. Appointments

University of Virginia	Research Associate Professor	
INFN-Rome	Permanent Staff Member	1991-2001
College of William and Mary	Visiting Professor	1995-96
INFN-Rome	Post-doctoral Fellow	1989-90

#### *Visiting Scientist Appointments:*

INFN-Laboratori Nazionali di Frascati	Summer 2003 through Summer 2007
Brookhaven National Laboratory	August 2001, August 2002
Argonne National Laboratory	July-August 1998, July-August 2007
Jefferson Laboratory	Summer 1994
Université Blaise Pascal (Clermont-Ferrand)	June 1992
Jefferson Laboratory	Summer 1991
University of Virginia	April 1991
University of Virginia	May-July 1990

### iii. Awards and Grants

- DOE Grant, Office of Nuclear Physics 2007 - present 90,000\$ per AY
- DOE Grant, Office of Nuclear Physics 2004 - 2007 52,300\$ per AY
- NSF ITR Grant (3% funding rate), DDDAS Program 2004 - 2007 54,000\$ per AY
- DOE Grant, Office of Nuclear Physics 2001 -2004 50,000\$ per AY
- NRC (COBASE) Grant 2002-03 7,000\$
- NSF, Visiting Professorship for Women 40,000\$  
College of William and Mary, 1995-96

#### iv. Publications since 2004

##### REFEREED JOURNALS

- G. R. Goldstein and S. Liuti,  
“*The Use of Dispersion Relations in Hard Exclusive Processes and the Partonic Interpretation of Deeply Virtual Compton Scattering,*”  
Phys. Rev. D **80**, 071501 (2009); arXiv:0905.4753 [hep-ph].
- J. Carnahan, H. Honkanen, S. Liuti, Y. Loitiere and P. R. Reynolds,  
“*New avenue to the Parton Distribution Functions: Self-Organizing Maps,*”  
Phys. Rev. D **79**, 034022 (2009); arXiv:0810.2598 [hep-ph].
- S. Ahmad, G. R. Goldstein and S. Liuti,  
“*Nucleon Tensor Charge from Exclusive  $\pi^0$  Electroproduction,*”  
Phys. Rev. D **79**, 054014 (2009); arXiv:0805.3568 [hep-ph].
- S. Ahmad, H. Honkanen, S. Liuti and S. K. Taneja,  
“*Generalized Parton Distributions from Hadronic Observables: Non-Zero Skewness,*”  
Eur. Phys. J. C **63**, 407 (2009); arXiv:0708.0268 [hep-ph],
- S. Ahmad, H. Honkanen, S. Liuti and S. K. Taneja,  
“*Generalized parton distributions from hadronic observables: Zero skewness,*”  
Phys. Rev. D **75**, 094003 (2007); [arXiv:hep-ph/0611046].
- S. Liuti and S. K. Taneja,  
“*Microscopic description of deeply virtual Compton scattering off spin-0 nuclei,*” Phys. Rev. C **72**, 032201 (2005)
- S. Liuti and S. K. Taneja,  
“*Nuclear medium modifications of hadrons from generalized parton distributions,*” Phys. Rev. C **72**, 034902 (2005)
- S. Liuti, “*Generalized parton distributions and transversity in nucleons and nuclei,*” Nucl. Phys. A **755**, 565 (2005)
- A. Fantoni, N. Bianchi and S. Liuti, “*Quark-hadron duality in structure functions,*” Eur. Phys. J. A **24S1**, 35 (2005)
- S. Liuti and S. K. Taneja, “*Generalized parton distributions and color transparency phenomena,*” Phys. Rev. **D70**, 074019 (2004)
- S.I. Alekhin, S.A. Kulagin and S. Liuti “*Isospin dependence of power corrections in deep inelastic scattering,*” Phys. Rev. D **69**, 114009 (2004)
- N. Bianchi, A. Fantoni and S. Liuti, “*Parton hadron duality in unpolarised and polarised structure functions,*” Phys. Rev. **D69**, 014505 (2004).

##### PUBLISHED CONFERENCE PROCEEDINGS

- G. R. Goldstein, O. G. Hernandez, S. Liuti and T. McAskill, “*Deeply*

*Virtual Neutrino Production of  $\pi^0$  from Nucleon and Nuclear Targets,*  
arXiv:0911.0455 [hep-ph].

• S. Ahmad, H. Honkanen, S. Liuti and S. K. Taneja, “*The Hybrid Generalized Parton Distributions Parametrization,*”  
AIP Conf. Proc. **1149**, 623 (2009).

• H. Honkanen and S. Liuti, “*New Angle On The Parton Distribution Functions: Self-Organizing Maps,*”  
AIP Conf. Proc. **1149**, 293 (2009).

• G. R. Goldstein and S. Liuti, “*Limitations on dispersion relations for Generalized Parton Distributions,*”  
(DIS 2009), Madrid, Spain, 26-30 Apr 2009.  
arXiv:0908.2215 [hep-ph].

• S. Liuti, S. Ahmad, C. Lin and H. T. Nguyen, “*Strategies to Extract Generalized Parton Distributions from Data,*”  
(DIS 2009), Madrid, Spain, 26-30 Apr 2009.  
arXiv:0908.2199 [hep-ph].

• S. Liuti and G. R. Goldstein, “*Accessing Generalized Transversity Distributions with Exclusive  $\pi^0$  Electroproduction,*”  
(DIS 2009), Madrid, Spain, 26-30 Apr 2009.  
arXiv:0908.2197 [hep-ph].

• G. R. Goldstein and S. Liuti, “*Exclusive Meson Electroproduction: GPDs, Regge and Dispersion Relations,*” AIP Conf. Proc. **1149**, 527 (2009)

• H. Honkanen and S. Liuti, “*New approach to the Parton Distribution Functions: Self-Organizing Maps,*” PoS **LC2008**, 022 (2008) [arXiv:0811.0213 [hep-ph]].

• S. Liuti, G. R. Goldstein and S. Ahmad, “*Chiral-Odd Generalized Parton Distributions from Exclusive  $\pi^0$  Electroproduction,*” arXiv:0807.1977 [hep-ph].

• G. R. Goldstein, S. Liuti and S. Ahmad, “*Transversity via Exclusive  $\pi^0$  Electroproduction,*”  
Transversity 2008, Ferrara, Italy, 28-31 May 2008.  
arXiv:0810.2128 [hep-ph].

• G. R. Goldstein and S. Liuti,  
“*Exclusive Pion-production and the Relation to Transversity,*”  
Published in \*London 2008, Deep inelastic scattering\* 217  
arXiv:0807.2301 [hep-ph].

• S. Liuti, S. Ahmad, G. R. Goldstein and L. Gamberg,  
“ *$\pi^0$  Electroproduction and Transversity,*”

arXiv:0712.2417 [hep-ph].

- S. Liuti, G. R. Goldstein and S. Ahmad,  
“*Chiral-Odd Generalized Parton Distributions from Exclusive  $\pi^0$  Electroproduction,*”

Published in \*London 2008, Deep inelastic scattering\* 237  
arXiv:0807.1977 [hep-ph].

- S. Liuti,  
“*A New Perspective on Parton Distributions in Nuclei*”  
Published in \*La Thuile 2006, Results and perspectives in particle physics\*  
165-170  
hep-ph/0608251

- H. Honkanen, S. Liuti, Y.C. Loitiere, D. Brogan and P. Reynolds,  
“*Obtaining parton distribution functions from self-organizing maps*”  
Published in \*Tsukuba 2006, Deep inelastic scattering\* 85-88  
hep-ph/0608254

- V. Barone *et al.* [PAX Collaboration],  
“*Antiproton proton scattering experiments with polarization,*”  
arXiv:hep-ex/0505054.

- S. Liuti, N. Bianchi and A. Fantoni, “*Structure Functions at Large Bjorken  $x$  and the Transition between Perturbative and Non-Perturbative QCD,*”  
AIP Conf. Proc. **792**, 253 (2005)

- A. Fantoni, N. Bianchi and S. Liuti, “*Quark-hadron duality and higher twist contributions in structure functions,*” AIP Conf. Proc. **747**, 126 (2005)

- S. Liuti and S. K. Taneja, “*Generalized parton distributions: A new avenue to color transparency phenomena,*” arXiv:hep-ph/0412389.

- S. Liuti, N. Bianchi and A. Fantoni, “*A perturbative QCD based study of polarized nucleon structure in the transition region and beyond: ‘Quarks, color neutral clusters, and hadrons’,*” arXiv:hep-ph/0412390.

## **v. Professional Service**

### MEMBERSHIP AND SERVICE

- APS Member
- Served on APS Topical Group on Hadronic Physics nominating committee (2009)

### EDITED PHYSICS VOLUMES

- Editor of SPIN 2008, 18th International Spin Physics Symposium (AIP Conference Proceedings 1149, 2009)

Co-editors: Donald G. Crabb, Yelena Prok, Matt Poelker, Simonetta Liuti, Donal B. Day, Xiaochao Zheng.

- Editor of Proceedings of the “*First Workshop on Quark-Hadron Duality and the Transition to Perturbative QCD*” Laboratori Nazionali di Frascati (Italy),

Publisher: World Scientific (2006), in Hackensack, USA, 284 p

Co-editors: A. Fantoni (INFN/LNF) and O. Rondon (U.Va.)

#### CONFERENCE ORGANIZATION/CONVENER

- **April 2010:** Convener Spin Section, DIS 2010, 18th International Workshop On Deep Inelastic Scattering And Related Subjects, April 19-23, Florence (Italy)
- **October 2008:** Member Local Organizing Committee “SPIN 2008”, Charlottesville, Virginia, USA.
- **Spring 2008 :** Chair of Organizing Committee, ECT Workshop on “Nuclear Medium Effects on the Quark and Gluon Structure of Hadrons”, ECT\*, Trento, Italy.
- **June 2005 :** Co-chair with A. Fantoni (Laboratori Nazionali di Frascati), and N. Bianchi (Laboratori Nazionali di Frascati): “*First Workshop on Quark-Hadron Duality and the Transition to Perturbative QCD*”, Laboratori Nazionali di Frascati (Italy), sponsored by INFN, Jefferson Laboratory, and Hampton University;  
<http://www.lnf.infn.it/conference/duality05/>
- **April 2002 :** Member Local Organizing Committee “Testing QCD through Spin Observables in Nuclear Targets”, University of Virginia.
- **December 1997 :** Co-organizer with W. Melnitchouk (Jefferson Laboratory), *Jefferson Lab Workshop on the Deep Inelastic Structure of Nuclei*, Jefferson Laboratory.

#### Ph.D. COMMITTEES

**January 2010** Member of Ph.D. Thesis Committee for Mitra Shabestari, Ph.D. Adviser Nilanga Liyanage, University of Virginia

**December 2006:** External Member of Ph.D. Thesis Committee for Simona Malace, Ph.D. Adviser Rolf Ent, Hampton University.

**January 1999:** External Member of Ph.D. Thesis Committee for Ioana Niculescu, Ph.D. Adviser Cynthia Keppel, Hampton University. The student received the “Best Thesis Award” at Jefferson Laboratory (September 2000).

#### REFEREE AND REVIEWER

- Reviewer of NSF and DOE proposals.
- Referee for Physical Review **D**, Physical Review **C**, Physical Review Letters, Physics Letters B, Nuclear Physics **A**, Journal of Physics **G**.

#### **vi. Research Supervision**

Graduate Student	Jose Osvaldo Gonzalez	2008-
Graduate Student	Kunal Kathuria	2009-
MS Student	Daniel Z. Perry	2008-10
Graduate Student	Saeed Ahmad	2005-08
Graduate Student	Swadhin K. Taneja (Dissertation Year Fellow)	2002-06
Post-doctoral Associate	Heli Honkanen	2005-07
Undergraduate Student	Leonard S. Woody (Computer Science/Physics)	2001-03

#### **vii. Teaching**

Electricity&Magnetism I	742	Fall 2009
Nuclear Physics I	871	Spring 2009
Electricity&Magnetism I	742	Fall 2008
Nuclear Physics I	871	Spring 2007
Subatomic Physics	572	Fall 2005
Nuclear Physics I	871	Spring 2005
Introductory Physics for Engineers II	241E	Fall 2004
Nuclear Physics II	872	Fall 2003
Nuclear Physics I	871	Spring 2003
Social Dimensions of Science	USEM	Fall 2002
Nuclear Physics I	871	Spring 2001
Modern Physics for Engineers	242E	Spring 2000
Nuclear Physics I	871	Spring 1999
Electricity&Magnetism II	343	Fall 1998
Electricity&Magnetism I	742	Spring 1998
Electricity&Magnetism I	742	Spring 1997
Nuclear Physics I	871	Spring 1997
Introductory Physics for Engineers II	241E	Fall 1996

#### **viii. Impact on Experimental Programs**

- Co-spokeperson of Jefferson Lab Letter of Intent to PAC35 (January, 2010) "Nuclear Exclusive and Semi-Exclusive Physics with a New CLAS12 Low Energy Detector"  
K. Hafidi, M. Amarian, W. Brooks, R. Dupré, D. Dutta, H. Egiyan, A. ElAlaoui, D. Gaskell, G.P. Gilfoyle, F.X. Girod, S. Liuti, S. Stepanyan.
- Co-spokeperson of Jefferson Lab CLAS collaboration experiment, E-08-

024,

“Deeply Virtual Compton Scattering off  $^4\text{He}$ ”

H. Egiyan, F. X. Girod, K. Hafidi, S. Liuti and E. Voutier.

- Co-author of Jefferson Lab CLAS collaboration experiment:  
“Deeply Virtual Compton Scattering at 6 GeV with Transversely Polarized Target using CLAS Detector”  
H. Avakian *et al.*
- Member of Jefferson Lab BoNuS Collaboration

### ix. Selected List of Publications prior to 2002

1. S. Liuti, R. Ent, C. E. Keppel and I. Niculescu,  
“Perturbative QCD analysis of local duality in a fixed  $W^{*2}$  frame-  
work,”  
Phys. Rev. Lett. **89**, 162001 (2002)
2. C. S. Armstrong, R. Ent, C. E. Keppel, S. Liuti, G. Niculescu and  
I. Niculescu,  
“Moments of the proton F2 structure function at low  $Q^{*2}$ ,”  
Phys. Rev. D **63**, 094008 (2001)
3. C. D. Cothran, D.B. Day, and S. Liuti  
“Off-shell Effects and Moments of the Deep Inelastic Nuclear Structure  
Functions”,  
Phys. Lett. **B421** (1998) 46.
4. O. Benhar and S. Liuti,  
“Accidental  $\xi$ -Scaling as a Signature of Nuclear Effects at  $x > 1$ ”.  
Phys. Lett. **B358** (1995) 173.
5. S. Liuti and R. Vogt,  
“Consequences of Nuclear Shadowing for Heavy Quarkonium Produc-  
tion in Hadron-Nucleus Interactions”.  
Phys. Rev. **C51** (1995) 2244.
6. F. Gross and S. Liuti,  
“Role of nuclear binding in the European Muon Collaboration effect”.  
Phys. Rev. **C45** (1992) 1374.
7. C. Ciofi degli Atti and S. Liuti,  
“A Realistic Many Body Approach to Deep Inelastic Scattering off Few-  
Nucleon Systems”.  
Phys. Rev. **C41** (1990) 1100.
8. L.L. Frankfurt, M. I. Strikman and S. Liuti,  
“Evidence for Enhancement of Gluon and Valence Quark Distributions

in Nuclei from Hard Lepton-Nucleus Processes” .  
Phys. Rev. Lett. **65** (1990) 1693.

9. C. Ciofi degli Atti and S. Liuti,  
“On the Effects of Nucleon Binding and Correlations in Deep Inelastic Scattering by Nuclei” .  
Phys. Lett. **225B** (1989) 215.

### Manuscripts submitted for publication

- G. R. Goldstein and S. Liuti  
”Exclusive  $\pi^0$  Electroproduction from a Spin 0 Target”
- G. R. Goldstein and S. Liuti  
”Neutral pion couplings and generalized parton distributions”
- G. R. Goldstein, O. G. Hernandez, S. Liuti and T. McAskill,  
“Deeply Virtual Neutrino Meson Production from Nucleon and Nuclear Targets” .
- S. Liuti, “Connection between In Medium Nucleon Form Factors and Deep Inelastic Structure Functions”; hep-ph/0601125

### xi. Outreach and Other Synergistic Activities

- Interdisciplinary Collaboration at the University of Virginia  
Research project (2004-2007) with P. Reynolds (School of Engineering and Applied Science, Department of Computer Science), and H. Cheliah (School of Engineering and Applied Science, Department of Mechanical and Aerospace Engineering), funded by NSF ITR Grant (3% funding rate), under the Dynamical Data Driven Applications Systems (DDDAS) program.
- **Ongoing**: Informal counselor of female students Physics Department and Curry School of Education.
- **Ongoing**: Organizer of Physics Department’s Subatomic Journal Club, [http : //galileo.phys.virginia.edu/classes/sajclub/](http://galileo.phys.virginia.edu/classes/sajclub/).
- **December 2006**: External Member of Ph.D. Thesis Committee for Simona Malace, Hampton University.
- **October 2006** Participant in Joint INT/Jlab/BNL Workshop on “*Hard Exclusive Processes at Jlab 12 GeV and a Future EIC*”
- **1998 - present**: Volunteer at pre-school, elementary, and middle schools in Charlottesville, VA, for Physics Shows.



- **1998/99 - present:** Hosted several women colloquium and seminar speakers (Amy Bug, Gail Dodge, Alessandra Fantoni, Haiyan Gao, Gina Hoatson, Sabine Jeschonnek, Cynthia Keppel, Margaret Murray, Vina Punjabi, Michelle Shinn).
- **1996/97-present** Part of the Faculty-Student Mentoring Program sponsored by the Office of African-American Affairs at the University of Virginia.
- **Fall 2004 - present** Member of PAX Collaboration (Polarized Antiproton EXperiments), <http://www.fz-juelich.de/ikp/pax/>
- **2002 - present** Theoretical support to the current experimental program at Jefferson Lab: BOund NUCleon Structure (BONUS) experiment **E03-012**.
- **2001 - present** Actively taking part with other theorists in the process of defining the physics goals for the upgrading of Jefferson Lab to 12 GeV, from the present 6 GeV.

#### xi. Invited Talks since 2007

##### **January 2010**

*Deep Exclusive Processes with Charm*  
 Electron Ion Collaboration Meeting  
 Stony Brook University, 1-12 January, 2010

##### **November 2009**

*Strategies to extract GPDs from data*  
 Workshop on Orbital Angular Momentum of Partons and Hadrons  
 ECT\*, Trento,  
 November 9-13,

##### **October 2009**

*Setting the Scale for DIS at Large Bjorken  $x$*   
 Institute for Nuclear Theory, University of Washington  
 4-9 October 2009

##### **September 2009**

*Strategies to extract GPDs from data*  
 Institute for Nuclear Theory, University of Washington  
 14-19 September 2009

##### **June 2009**

*What  $\pi^0$  electroproduction really measures*

TPSH 2009, Yerevan  
21-26 June 2009

**May 2009**

*What  $\pi^0$  electroproduction really measures*  
Jefferson Laboratory Seminar  
May 2009

**April 2008**

*Strategies to extract GPDs from data ,*  
XVI International Workshop on Deep Inelastic Scattering,  
DIS 2009, 26-30 April 2009  
Madrid

**April 2008**

*$\pi^0$  Electroproduction,*  
XVI International Workshop on Deep Inelastic Scattering,  
DIS 2009, 26-30 April 2009  
Madrid

**April 2008**

*Highlights of DIS related theory for the Jlab 12 GeV program,*  
XVI International Workshop on Deep Inelastic Scattering,  
DIS 2009, 26-30 April 2009  
Madrid

**April 2008**

*Highlights of DIS related theory for the Jlab 12 GeV program,*  
XVI International Workshop on Deep Inelastic Scattering,  
DIS 2009, 26-30 April 2009  
Madrid

**November 2008**

*Generalized Parton Distributions in Nuclei,*  
Grenoble LSPC  
Journé Noyaux, GDR Nuclon

**November 2008**

*Realistic parameterization of GPDs and its applications*  
Jlab Theory Group Seminar  
November 10th, 2008.

**October 2008**

*Hadronic Physics Theory at U. Va.*  
APS DNP Meeting  
Oakland, USA  
October 25th, 2008.

**August 2008**

*A Bottom-up Approach to Extract GPDs from Experiment*  
Hall B Workshop on DVCS  
Jlab, August 6th-7th, 2008

**July 2008**

$\pi^0$  *Electroproduction and transversity*,  
International Workshop On Transverse Spin Physics  
30 Jun - 4 Jul 2008, Beijing, China

**June 2008**

*Extraction of Generalized Parton Distributions from Experiment*, ECT\* Trento,  
June 9-13, 2008.

**April 2008**

*Chiral-Odd Generalized Parton Distributions from Exclusive  $\pi^0$  Electroproduction*,  
XVI International Workshop on Deep Inelastic Scattering,  
London, England, April 7-11, 2008.

**October 2007**

$\pi^0$  *Electroproduction and transversity*,  
Hadrons 07  
Laboratri Nazionali di Frascati, Frascati, Italy, October 8-13, 2007.

**May 2007** *Obtaining Parton Distributions from Hadronic Observables and Lattice QCD*,

Workshop on Exclusive Reactions at High Momentum Transfer  
Jefferson Lab, Newport News, Virginia, May 21-24, 2007.

**April 2007**

*Parton Distributions from Hadronic Observables and Lattice QCD*,  
XV International Workshop on Deep Inelastic Scattering,  
Münich, Germany, April 16-21, 2007.

**April 2007**

*“A New Toolbox for Hadronic Studies: Optics and Self-Organizing Maps”*,  
Colloquium: Tufts University