

# Curriculum Vitae

## Dmitri Krioukov

Cooperative Association for Internet Data Analysis (CAIDA) San Diego Supercomputer Center (SDSC) University of California San Diego (UCSD) 9500 Gilman Drive, MC 0505, La Jolla, California 92093-0505, USA	Phone: (858) 822-5476 Fax: (858) 534-5117 Email: <a href="mailto:dima@ucsd.edu">dima@ucsd.edu</a> <a href="http://www.caida.org/~dima/">http://www.caida.org/~dima/</a>
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### INTERESTS

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Large networks: statistical analysis, transport/signaling processes, navigation/routing in the Internet and other complex networks; geometric approaches to the analysis of massive networks and big data.

### EDUCATION

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- **Ph.D. in Physics (1994-1998)**  
*Old Dominion University, Norfolk, Virginia, USA*  
Dissertation Title: “Construction of Effective Electromagnetic Currents for Two-Body Quasipotential Equations.”  
Advisor: J. W. Van Orden
- **Diploma with Honors in Theoretical Physics (1987-1993)**  
*St. Petersburg State University, St. Petersburg, Russia*  
Thesis Title: “Non-Standard Differential Calculi on the Quantum Group  $SL_q(2)$ .”  
Advisor: V. D. Lyakhovsky

### POSITIONS HELD

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- **Sr. Research Scientist (2004-Present)**  
Cooperative Association for Internet Data Analysis (CAIDA)  
San Diego Supercomputer Center (SDSC)  
University of California San Diego (UCSD), San Diego, California
- **Research Scientist (2000–2002)**  
Nortel Networks, Herndon, Virginia
- **Network Architect (1998-2000)**  
Dimension Enterprises, Herndon, Virginia
- **Network Engineer (1993-1994)**  
The Central R&D Institute for Robotics and Cybernetics, St. Petersburg, Russia

## SCIENTIFIC COMMUNITY ACTIVITIES

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- **Journal editor**
  - Computer Communication Review (2007-2010)
- **Journal reviewer**
  - Nature
  - PLOS ONE
  - Physical Review Letters (PRL)
  - Physical Review E (PRE)
  - Europhysics Letters (EPL)
  - Physica A
  - Network Science
  - Internet Mathematics
  - Central European Journal of Mathematics (CEJM)
  - Stochastic Models
  - Transactions on Networking (ToN)
  - Journal on Selected Areas in Communications (JSAC)
  - Computer Communication Review (CCR)
  - Computer Networks (ComNet)
  - Computer Communications (ComCom)
  - IEEE Communications Letters
  - IET Communications
  - Operations Research
- **Funding agency grant reviewer**
  - National Science Foundation (NSF)
  - Binational Science Foundation (BSF)
- **Conference technical program committee**
  - Conf. of the ACM Special Interest Group on Data Communication (SIGCOMM), 2009
  - Workshop on Simplifying Complex Networks for Practitioners (SIMPLEX), 2009
  - Workshop on Network Science for Communication Networks (NetSciCom), 2009
  - Conf. of the ACM Special Interest Group on Data Communication (SIGCOMM), 2007
  - Conf. on Emerging Networking Experiments and Technologies (CoNEXT), 2006
- **Conference reviewer**
  - Conf. on Computing, Communications, and Control Technologies (CCCT), 2010
  - Conf. on Performance Evaluation Methodologies and Tools (ValueTools), 2009
  - Passive and Active Measurement Conf. (PAM), 2008
  - Internet Measurement Conf. (IMC), 2006
  - USENIX Annual Technical Conf. (USENIX), 2006
  - Conf. of the ACM Special Interest Group on Data Communication (SIGCOMM), 2005
  - Conf. on Computer Communications (INFOCOM), 2005
  - Passive and Active Measurement Conf. (PAM), 2005
  - Conf. on High Performance Switching and Routing (HPSR), 2005
  - Internet Measurement Conf. (IMC), 2004
- **Conference organizer**
  - Chair and organizer, *Network Geometry Workshop*  
University of California San Diego, San Diego, California, July 2013
  - Co-organizer, *Workshop on Geometry of Large Networks*  
American Institute of Mathematics, Palo Alto, California, November 2011
  - Chair, *Workshop on Network Geometry*  
University of Cyprus, Limassol, Cyprus, January 2011

- Program co-chair, *Workshop on Information Theory and Applications (ITA)*  
University of California San Diego, San Diego, California, February 2010
- Chair, *Workshop on Networks and Navigation*  
Santa Fe Institute, Santa Fe, New Mexico, August 2008
- Chair, *Workshop on the Internet Topology (WIT)*  
University of California San Diego, San Diego, California, May 2006
- **Seminar organizer**
  - Organizer, *UCSD Complex Network Seminar Series ([DANCES](#))*  
University of California San Diego, La Jolla, California, 2013

## STUDENTS

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- Postgraduate students
  - **Konstantine Zuev**  
Ph.D. in Mathematics, Moscow State University  
Advisor: Alexey Bolsinov and Anatoly Fomenko  
Currently with: University of Liverpool
  - **Rodrigo Aldecoa**  
Ph.D. in Computer Science, Instituto de Biomedicina de Valencia  
Advisor: Ignacio Marín  
Currently with: University of California San Diego
  - **Chiara Orsini**  
Ph.D. in Information Engineering, University of Pisa  
Advisor: Luciano Lenzini  
Currently with: University of California San Diego
  - **Massimo Ostili**  
Ph.D. in Physics, University of Rome “La Sapienza”  
Advisor: Carlo Presilla  
Currently with: University of California San Diego
  - **Maksim Kitsak**  
Ph.D. in Physics, Boston University  
Advisors: Eugene Stanley and Shlomo Havlin  
Currently with: Northeastern University
  - **Fragkiskos Papadopoulos**  
Ph.D. in Electrical and Computer Engineering, University of Southern California  
Advisor: Konstantinos Psounis  
Currently with: Cyprus University of Technology
- Graduate students
  - **Will Cunningham**  
Northeastern University  
Currently with: Northeastern University
- Graduate interns
  - **Pol Colomer de Simon**  
University of Barcelona  
Currently with: University of Barcelona
  - **Chiara Orsini**  
University of Pisa  
Currently with: University of California San Diego
  - **Xuemei Ding**  
University of California San Diego  
Currently with: University of California San Diego

- **Fragkiskos Papadopoulos**  
University of Southern California  
Currently with: Cyprus University of Technology
- **Srinivas Shakkottai**  
University of Illinois at Urbana-Champaign  
Currently with: Texas A&M University
- **Xenofontas Dimitropoulos**  
Georgia Institute of Technology  
Currently with: ETH Zürich
- **Priya Mahadevan**  
University of California San Diego  
Currently with: Palo Alto Research Center
- **Almerima Jamakovic**  
Delft University of Technology  
Currently with: TNO Information and Communication Technology
- **Benoît Donnet**  
Université Pierre et Marie Curie  
Currently with: Université catholique de Louvain
- **Yihua He**  
University of California Riverside  
Currently with: Yahoo! Inc
- **Jasmine Lie Zan**  
University of California Irvine  
Currently with: Rockwell Collins
- **Raymond Liu**  
University of California Los Angeles  
Currently with: Scalable Network Technologies

## **OTHER COLLABORATORS**

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- University of California San Diego, San Diego, California
  - Cooperative Association for Internet Data Analysis
    - **kc claffy**
    - **Marina Fomenkov**
    - **Ryan Koga**
    - **Young Hyun**
    - **Ken Keys**
    - **Bradley Huffaker**
  - Mathematics
    - **David Rideout**
    - **David Meyer**
    - **Fan Chung**
  - Neurosciences Institute
    - **Ralph Greenspan**
  - Computer Science and Engineering
    - **Amin Vahdat**
    - **Charles Elkan**
  - San Diego Supercomputer Center
    - **Robert Sinkovits**
- University of Barcelona, Barcelona, Spain
  - **Marian Boguñá** (Physics)
  - **Mariángeles Serrano** (Physics)

- Cyprus University of Technology, Limassol, Cyprus
  - **Constantinos Psomas** (Electrical and Computer Engineering)
- Boston University, Boston, Massachusetts
  - **Paul Krapivsky** (Physics)
- Georgia Institute of Technology, Atlanta, Georgia
  - **George Riley** (Electrical and Computer Engineering)
- Intel Research, Berkeley, California
  - **Kevin Fall**
- Tufts University, Boston, Massachusetts
  - **Arthur Brady** (Computer Science)
- Northeastern University, Boston, Massachusetts
  - **Alessandro Vespignani** (Physics)
- AT&T Research, Florham Park, New Jersey
  - **Walter Willinger**
- Duke University, Durham, North Carolina
  - **Xiaowei Yang** (Computer Science)
- Italian National Research Council, Pisa, Italy
  - **Enrico Gregory** (Institute of Informatics and Telematics)
- University of Pisa, Pisa, Italy
  - **Luciano Lenzini** (Information Engineering)

## **PUBLICATIONS ('#' marks >100 citations according to Google Scholar)**

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- **Papers**
  - C. Orsini, E. Gregori, L. Lenzini, and D. Krioukov,  
**Evolution of the Internet  $k$ -dense structure**,  
*IEEE/ACM Transactions on Networking (to appear, 2013)* ([DOI](#), [arXiv](#)),  
One-sentence abstract: The normalized  $k$ -dense decomposition of the Internet is time-invariant.
  - D. Krioukov and M. Ostilli,  
**Duality between equilibrium and growing networks**,  
*Physical Review E*, v.88, 022808, 2013 ([DOI](#), [arXiv](#)),  
One-sentence abstract: under certain conditions, satisfied in random geometric graphs, causal sets, and complex networks, equilibrium and growing network models are exactly identical.
  - F. Papadopoulos, C. Psomas, and D. Krioukov,  
**Replaying the Geometric Growth of Complex Networks and Application to the AS Internet**,  
*ACM SIGMETRICS Performance Evaluation Review*, v.40, n.3, p.104-106, 2012 ([DOI](#), [arXiv](#)),  
One-sentence abstract: replaying the historical growth of complex networks using popularity\*similarity optimization maps them accurately to their hyperbolic spaces, and predicts missing links.

- D. Krioukov, M. Kitsak, R. Sinkovits, D. Rideout, D. Meyer, and M. Boguna, **Network Cosmology**, *Nature Scientific Reports*, v.2, p.793, 2012 ([DOI](#), [arXiv](#)),  
Press: [UCSD](#), [SDSC](#), [Space](#), [Time](#), [TheRegister](#), [CBS](#), [HuffingtonPost](#), [HuffingtonPostUK](#), [PopularScience](#), [LiveScience](#), [Slashdot](#), [Robots.Net](#), [PhysOrg](#), [ScienceDaily](#), [TGDaily](#), [DigitalJournal](#), [Vesti](#), [MK](#), [LifeNews](#), [theRunet](#), ...  
One-sentence abstract: The large-scale structure and dynamics of complex networks and the universe are asymptotically identical.
- F. Papadopoulos, M. Kitsak, M. Angeles Serrano, M. Boguna, and D. Krioukov, **Popularity versus Similarity in Growing Networks**, *Nature*, v.489, p.537, 2012 ([DOI](#), [arXiv](#)),  
Press: [UCSD](#), [SDSC](#), [Nature](#), [Nature Physics](#), [PhysOrg](#), [ScienceDaily](#), [AMS](#), [Le Scienze](#), [STRE](#), [Elsevier](#), ...  
One-sentence abstract: Trade-offs between popularity and similarity shape the structure and dynamics of growing complex networks, with preferential attachment emerging from local optimization processes, casting these networks as random geometric graphs growing in hyperbolic spaces.
- D. Krioukov,  
**The Proof of Innocence**, *Annals of Improbable Research*, v.18, n.4, p.12, 2012 ([AIR](#), [arXiv](#)),  
Press: [a top physics newsmaker of 2012](#), appearing at all major news, TV, and radio channels worldwide, such as [ABC](#), [ABC Science](#), [BBC](#), [CBS](#), [CNET](#), [CNN](#), [CNN International](#), [Compulenta](#), [Corriere](#), [Daily Mail](#), [Echo of Moscow](#), [Fox News](#), [KPBS](#), [LA Times](#), [LentaRu](#), [MSN](#), [NBC](#), [NewsRu](#), [NPR](#), [CarTalk](#), [Physics Central](#), [Salon](#), [Science](#), [Slashdot](#), [The Star](#), [Union Tribune](#), [Wired](#), [Yahoo](#), ...  
One-sentence abstract: A way to fight your traffic tickets.
- M. Kitsak and D. Krioukov,  
**Hidden Variables in Bipartite Networks**, *Physical Review E*, v.84, 026114, 2011 ([DOI](#), [arXiv](#)),  
One-sentence abstract: The hidden variable framework is extended to bipartite networks.
- M. Angeles Serrano, D. Krioukov, and M. Boguna,  
**Percolation in Self-Similar Networks**, *Physical Review Letters*, v.106, 048701, 2011 ([DOI](#), [arXiv](#)),  
One-sentence abstract: Self-similar networks have zero percolation threshold.
- D. Krioukov, F. Papadopoulos, M. Kitsak, A. Vahdat, and M. Boguna,  
**Hyperbolic Geometry of Complex Networks**, *Physical Review E*, v.82, 036106, 2010 ([DOI](#), [arXiv](#)),  
One-sentence abstract: A framework to study the structure and function of complex networks in purely geometric terms.

- M. Boguna, F. Papadopoulos, and D. Krioukov,  
**Sustaining the Internet with Hyperbolic Mapping**,  
*Nature Communications*, v.1, p.62, 2010 ([DOI](#), [arXiv](#), [data](#)),  
 Press: [UCSD](#), [SDSC](#), [U. Barcelona](#), [Nature](#), [New Scientist](#), [IEEE Spectrum](#),  
[Communications of the ACM](#), [Computerworld](#), [MIT Scope](#), [The Register](#), [CBC](#), [El Pais](#),  
[TOVIMA](#), [CyprusMail](#), [Electronics Weekly](#), [PhysOrg](#), [ACMEscience](#), [Science Daily](#), [I  
 Programmer](#), [ISPreview](#), [PC Pro](#), [R&D Mag](#), [EnterTheGrid](#), [CNews](#), [Compulenta](#),  
[DailyUA](#), ...  
One-sentence abstract: Mapping the Internet to its underlying hyperbolic space enables  
 optimal routing in the Internet.
  
- S. Shakkottai, M. Fomenkov, R. Koga, D. Krioukov, and kc claffy,  
**Evolution of the Internet AS-Level Ecosystem**,  
*European Physical Journal B*, v.74, p.271-278, 2010 ([DOI](#), [arXiv](#)),  
One-sentence abstract: A customer-provider-based modification of preferential attachment  
 explains Internet topology evolution.
  
- F. Papadopoulos, D. Krioukov, M. Boguna, and A. Vahdat,  
**Greedy Forwarding in Dynamic Scale-Free Networks  
 Embedded in Hyperbolic Metric Spaces**,  
*INFOCOM 2010* ([DOI](#), [arXiv](#)),  
One-sentence abstract: Almost all greedy-routing paths reach their destinations and follow  
 shortest paths in scale-free networks growing on the hyperbolic plane.
  
- X. Dimitropoulos, D. Krioukov, A. Vahdat, and G. Riley,  
**Graph Annotations in Modeling Complex Network Topologies**,  
*ACM Transactions on Modeling and Computer Simulation*, v.19, n.4, p.17, 2009  
 ([DOI](#), [arXiv](#)),  
One-sentence abstract: How to model, analyze, and generate complex network topologies  
 using the correlations among network-specific annotations ("types") of links and nodes.
  
- D. Krioukov, F. Papadopoulos, A. Vahdat, and M. Boguna,  
**Curvature and Temperature of Complex Networks**,  
*Physical Review E*, v.80, 035101(R), 2009 ([DOI](#), [arXiv](#)),  
One-sentence abstract: Hidden hyperbolic geometries, which are abstractions of the  
 hierarchical (community) structure of complex networks, underlie and explain their  
 observed scale-free topologies.
  
- D. Krioukov, F. Papadopoulos, M. Boguna, and A. Vahdat,  
**Greedy Forwarding in Scale-Free Networks Embedded in Hyperbolic Metric Spaces**,  
*ACM SIGMETRICS Performance Evaluation Review*, v.37, n.2, p.15-17, 2009  
 ([DOI](#), [arXiv](#)),  
One-sentence abstract: Greedy forwarding in synthetic scale-free networks emerging on  
 underlying hyperbolic metric spaces is remarkably efficient and robust with respect to link  
 failures.
  
- kc claffy, Y. Hyun, K. Keys, M. Fomenkov, and D. Krioukov,  
**Internet Mapping: From Art to Science**,  
*CATCH 2009* ([DOI](#)),  
One-sentence abstract: Introducing *Ark*, CAIDA's new Internet measurement  
 infrastructure.

- M. Boguna and D. Krioukov,  
**Navigating Ultrasmall Worlds in Ultrashort Time,**  
*Physical Review Letters*, v.102, 058701, 2009 ([DOI](#), [arXiv](#)),  
 Press: [Nature](#), [NewScientist](#), [PhysOrg](#),  
One-sentence abstract: Greedy-routing paths are asymptotically shortest paths in scale-free, strongly clustered networks.
  
- M. Boguna, D. Krioukov, and kc claffy,  
**Navigability of Complex Networks, #**  
*Nature Physics*, v.5, p.74-80, 2009 ([DOI](#), [arXiv](#)),  
 Press: [UCSD](#), [Nature](#), [DailyTech](#), [Science Daily](#), [Voice of San Deigo](#), [Technology Review](#), [news:lite](#), [Lenta.ru](#), ...  
One-sentence abstract: Complex networks have navigable topologies.
  
- S. Shakkottai, M. Fomenkov, R. Koga, D. Krioukov, and kc claffy,  
**Evolution of the Internet AS-Level Ecosystem,**  
*COMPLEX 2009* ([DOI](#), [arXiv](#)),  
One-sentence abstract: A customer-provider-based modification of preferential attachment explains Internet topology evolution.
  
- P. Krapivsky and D. Krioukov,  
**Scale-Free Networks as Preasymptotic Regimes of Superlinear Preferential Attachment,**  
*Physical Review E*, v.78, 026114, 2008 ([DOI](#), [arXiv](#)),  
One-sentence abstract: Even super-linear preferential attachment can produce scale-free networks, although it can do so only in its vast pre-asymptotic regimes, which bring up the question what if observed power laws are actually pre-asymptotic effects?
  
- X. Dimitropoulos, M. Angeles Serrano, and D. Krioukov,  
**On Cycles in AS Relationships,**  
*ACM SIGCOMM Computer Communication Review (CCR)*, v.38, n.3, p.103-104, 2008 ([DOI](#), [arXiv](#)),  
One-sentence abstract: Cycles induced by business relationships among ASs are expected.
  
- M. Angeles Serrano, D. Krioukov, and M. Boguna,  
**Self-Similarity of Complex Networks and Hidden Metric Spaces,**  
*Physical Review Letters*, v.100, 078701, 2008 ([DOI](#), [arXiv](#)),  
One-sentence abstract: Self-similarity of clustering in real complex networks provides a strong empirical evidence that hidden metric spaces underlie these networks.
  
- P. Mahadevan, C. Hubble, D. Krioukov, B. Huffaker, and A. Vahdat,  
**Orbis: Rescaling Degree Correlations to Generate Annotated Internet Topologies, #**  
*SIGCOMM 2007; ACM SIGCOMM Computer Communication Review*, v.37, n.4, p.325-336, 2007 ([DOI](#)),  
 Press: [UCSD](#), [PhysOrg](#), [Science Daily](#), [UCSD](#)  
One-sentence abstract: Network topology generator inspired by the  $dK$ -series.



- D. Krioukov, kc claffy, K. Fall, and A. Brady,  
**On Compact Routing for the Internet, #**  
*ACM SIGCOMM Computer Communication Review (CCR), v.37, n.3, p.41-52, 2007*  
[\(DOI, arXiv\)](#),  
One-sentence abstract: Compact routing generally assumes the full global knowledge of the network topology, and therefore it cannot help with communication overhead/convergence scaling problems in Internet routing.
- D. Krioukov, F. Chung, kc claffy, M. Fomenkov, A. Vespignani, and W. Willinger,  
**The Workshop on Internet Topology (WIT) Report,**  
*ACM SIGCOMM Computer Communication Review (CCR), v.37, n.1, p.69-73, 2007*  
[\(DOI, arXiv\)](#),  
One-sentence abstract: Some agreements about the Internet topology among researchers from different communities are reported; there are more disagreements, of course!
- X. Dimitropoulos, D. Krioukov, M. Fomenkov, B. Huffaker, Y. Hyun, kc claffy, and G. Riley,  
**AS Relationships: Inference and Validation, #**  
*ACM SIGCOMM Computer Communication Review (CCR), v.37, n.1, p.29-40, 2007*  
[\(DOI, arXiv, data\)](#),  
One-sentence abstract: Infer the AS relationships using our best-of-breed heuristics, validate their results via a questionnaire to network operators, adjust the code to run automatically once a week, and make the data publicly available.
- P. Mahadevan, D. Krioukov, K. Fall, and A. Vahdat,  
**Systematic Topology Analysis and Generation Using Degree Correlations, #**  
*SIGCOMM 2006; ACM SIGCOMM Computer Communication Review (CCR), v.36, n.4, p.135-146, 2006* [\(DOI, arXiv\)](#),  
One-sentence abstract:  $dK$ -series is a series of degree correlations in small graphs on increasing size  $d$ , which does not have to be large: reproducing the  $2K$ -correlations for the AS Internet topology reproduces its global structure, while  $d=3$  is enough even for "very designed, non-random" graphs.
- X. Dimitropoulos, D. Krioukov, G. Riley, and kc claffy,  
**Revealing the Autonomous System Taxonomy: The Machine Learning Approach,**  
*PAM 2006 (best paper award)* [\(PAM, arXiv, data\)](#),  
One-sentence abstract: All you wish to know about the AS-level Internet topology: ASs are classified into AS types using a series of AS attributes, and all the data is made publicly available, along with AS links classified by AS business relationships.
- P. Mahadevan, D. Krioukov, M. Fomenkov, B. Huffaker, X. Dimitropoulos, kc claffy, and A. Vahdat,  
**The Internet AS-Level Topology: Three Data Sources and One Definitive Metric, #**  
*ACM SIGCOMM Computer Communication Review (CCR), v.36, n.1, p.17-26, 2006*  
[\(DOI, arXiv, data\)](#),  
One-sentence abstract: Extract the Internet AS topology from BGP routing tables and updates, traceroutes (skitter), and WHOIS databases, compute the most popular metrics for all the extracted topologies, and make all the resulting data (graphs and computed metrics) publicly available.

- X. Dimitropoulos, D. Krioukov, B. Huffaker, kc claffy, and G. Riley,  
**Inferring AS Relationships: Dead End or Lively Beginning**,  
*WEA 2005; LNCS 3503:113-125, 2005* ([DOI](#), [arXiv](#)),  
One-sentence abstract: Yet another AS business relationship inference heuristic combining the best features of the best existing heuristics.
- X. Dimitropoulos, D. Krioukov, and G. Riley,  
**Revisiting Internet AS-Level Topology Discovery**,  
*PAM 2005; LNCS 3431:177-188, 2005* ([DOI](#), [arXiv](#)),  
One-sentence abstract: In the BGP updates data the number of unique AS links grows linearly with the observation time, while the topological properties of BGP-updates- and BGP-tables-derived AS graphs are similar.
- D. Krioukov, K. Fall, and X. Yang,  
**Compact Routing on Internet-Like Graphs, #**  
*INFOCOM 2004* ([DOI](#), [INFOCOM](#)),  
One-sentence abstract: Compact routing on scale-free networks yields essentially the best possible trade-off between the average stretch (optimality of paths) and size of routing tables (memory requirements per node).

- **Technical reports and arXiv's**

- M. Boguna, M. Kitsak, and D. Krioukov,  
**Cosmological Networks** ([arXiv](#), 2013),  
One-sentence abstract: A network of causal connections among stationary observers randomly distributed in any open homogeneous and isotropic FLRW universe is a growing power-law graph.
- F. Papadopoulos, C. Psomas, and D. Krioukov,  
**Network Mapping by Replaying Hyperbolic Growth** ([arXiv](#), 2013),  
One-sentence abstract: a simple and accurate method to map complex networks to their hyperbolic spaces.
- A. Jamakovic, P. Mahadevan, A. Vahdat, M. Boguna, and D. Krioukov,  
**How Small Are Building Blocks of Complex Networks** ([arXiv](#), 2009),  
One-sentence abstract: The global structure of complex networks is statistically determined by the probability of the presence of links between node triples, once this probability accounts for the degree of the individual nodes.
- P. Mahadevan, D. Krioukov, M. Fomenkov, B. Huffaker, X. Dimitropoulos, kc claffy, and A. Vahdat,  
**Lessons from Three Views of the Internet Topology**,  
*CAIDA technical report CAIDA-TR-2005-02, 2005* ([CAIDA](#), [arXiv](#)),  
One-sentence abstract: Extract the Internet AS topology from BGP routing tables and updates, traceroutes (skitter), and WHOIS databases, compute the most popular metrics for all the extracted topologies, and make all the resulting data (graphs and computed metrics) publicly available.

- D. Krioukov, K. Fall, and X. Yang,  
**Compact Routing on Internet-Like Graphs**,  
*Intel Research technical report IRB-TR-03-10* ([arXiv](#)),  
One-sentence abstract: Compact routing on scale-free networks yields essentially the best possible trade-off between the average stretch (optimality of paths) and size of routing tables (memory requirements per node).
- **Conference posters**
  - X. Dimitropoulos, G. Riley, D. Krioukov, and R. Sundaram,  
**Towards a Topology Generator Modeling AS Relationships**,  
*IEEE ICNP, 2005*
  - P. Mahadevan, D. Krioukov, B. Huffaker, k claffy, and A. Vahdat  
**Impact of Degree Correlations on Topology Generators**,  
*ACM SIGCOMM, 2005*
  - X. Dimitropoulos, D. Krioukov, G. Riley, and k claffy,  
**Classifying the Types of Autonomous Systems in the Internet**,  
*ACM SIGCOMM, 2005*
- **Internet Research Task Force (IRTF) publications**
  - E. Davies, A. Doria, H. Berkowitz, D. Krioukov, M. Carlzon, A. Bergsten, O. Pers, Y. Jiang, L. Carr-Motyckova, P. Fransson, O. Schelen, and T. Madsen,  
**Analysis of Inter-Domain Routing Requirements and History**,  
*Routing Research Working Group RFC5773, 2010* ([pdf](#), [txt](#)).
  - E. Davies, A. Doria, H. Berkowitz, D. Krioukov, M. Carlzon, A. Bergsten, O. Pers, Y. Jiang, L. Carr-Motyckova, P. Fransson, O. Schelen, and T. Madsen,  
**Future Domain Routing Requirements**,  
*Routing Research Working Group ID, 2001* ([pdf](#), [txt](#)).
  - H. Berkowitz and D. Krioukov,  
**To Be Multihomed: Requirements and Definitions**,  
*Network Working Group ID, 2001* ([pdf](#), [txt](#)).
- **White papers**
  - **Video Codecs: Comparative Analysis and Performance Evaluation**  
Nortel Networks, 2001
  - **MPLS Layer 2 VPNs**  
Nortel Networks, 2001
  - **Virtual Block Injection (VBI): the Specification of a New Content Routing Algorithm**  
Nortel Networks, 2001
- **Book chapter**
  - **Integrating Nonrouted Services and IRB**,  
In [CCNP: ACRC Study Guide](#),  
McGraw-Hill, 1999.

## TALKS

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- **Invited**

- *Bell Labs-NIST Workshop on Large-Scale Networks*  
Bell Labs, Murray Hill, New Jersey, October 2013  
**Duality between static and dynamic networks**
- *IQC workshop on quantum computation and complex networks*  
Institute for Quantum Computing, University of Waterloo,  
Waterloo, Ontario, Canada, May 2013  
**Complex Networks in Quantum Gravity**
- *Structure, Statistical Inference and Dynamics in Networks: From Graphs to Rich Data*  
Santa Fe Institute, Santa Fe, New Mexico, May 2013  
**Inferring Latent Geometries of Real Networks**
- *SIAM Conference on Computational Science & Engineering (CSE)*  
SIAM, Boston, Massachusetts, March 2013  
**Popularity versus Similarity in Growing Networks**
- Northeastern University, Boston, Massachusetts, February 2013  
**Physics and Geometry of Networks**
- University of Southern California, Information Sciences Institute,  
Los Angeles, California, November 2012  
**Popularity versus Similarity in Growing Networks**
- University of Houston, Houston, Texas, November 2012  
**Large graphs in physics:  
From statistical mechanics of networks to quantum cosmology**
- *DARPA GRAPHS Kickoff*  
DARPA, Chicago, Illinois, July 2012  
**The Universal Laws of Structural Dynamics in Large Graphs**
- *DARPA Mathematics Summit*  
DARPA, Lake Tahoe, Nevada, February 2012  
**Hyperbolic Geometry of Large Networks**
- California Institute of Technology, Pasadena, California, February 2012  
**Popularity versus Similarity in Growing Networks**
- University of Maryland, College Park, Maryland, November 2011  
**Popularity versus Similarity in Growing Networks**
- *Geometry of Large Networks*  
American Institute of Mathematics, Palo Alto, California, October 2011  
**Geometry of Large Networks**
- *Large Graphs: Modeling, Algorithms, and Applications*  
Institute for Mathematics and Its Applications, Minneapolis, Minnesota, October 2011  
**Popularity versus Similarity in Growing Networks**
- *Geometry of Networks*  
Bell Labs, Murray Hill, New Jersey, April 2011  
**Hyperbolic Geometry of Complex Networks**

- *Decision Making: Bridging Psychophysics and Neurophysiology*  
University of North Texas, Denton, Texas, March 2011  
**Percolation in Self-Similar Networks**
- *Different Angles on Network Complexity, Engineering, and Science*  
University of California San Diego, San Diego, California, December 2010  
**Complex Network Geometry and Navigation**
- Bielefeld University, Bielefeld, Germany, November 2010  
**Hyperbolic Geometry of Complex Networks**
- *Robustness of Complex Networks*  
Delft University of Technology, Delft, Netherlands, November 2010  
**Robustness of Targeted Transport in Complex Networks**
- University Pierre & Marie Curie, Paris, France, July 2010  
**Optimal Routing in a Hyperbolically Mapped Internet**
- *Toward Evolutive Routing Algorithms for Scale-Free/Internet-Like Networks*  
Laboratoire Bordelais de Recherche en Informatique, Bordeaux, France, July 2010  
**Optimal Routing in a Hyperbolically Mapped Internet**
- *Algorithms for Modern Massive Data Sets*  
Stanford University, Palo Alto, California, June 2010  
**Hyperbolic Mapping of Complex Networks**
- *Shared Organizing Principles in the Computing and Biological Sciences*  
National Science Foundation, Arlington, Virginia, May 2010  
**Navigability of Networks**
- *Decision Making: A Psychophysics Application of Network Science*  
University of North Texas, Denton, Texas, January 2010  
**Navigability of Complex Networks**
- *Center for Applied Mathematical Sciences*  
University of Southern California, Los Angeles, California, October 2009  
**Hyperbolic Geometry of Complex Networks**
- *Southern California Symposium on Network Economics and Game Theory*  
University of Southern California, Los Angeles, California, October 2009  
**Evolution of the Internet Ecosystem**
- Telefonica Research, Barcelona, Spain, June 2009  
**dK-series and Hidden Hyperbolic Metric Spaces**
- *Future Internet Design Meeting*  
National Science Foundation, Arlington, Virginia, April 2009  
**Hidden Metric Spaces and Navigability of Complex Networks**
- *BCNet Workshop*  
University of Barcelona, Barcelona, Spain, December 2008  
**Hyperbolic Geometry and Scale-Free Topology of Complex Networks**
- IBM Research, Zürich, Switzerland, June 2008  
**Routing in the Internet and Navigability of Scale-Free Networks**
- ETH, Zürich, Switzerland, June 2008  
**Routing in the Internet and Navigability of Scale-Free Networks**

- University of Barcelona, Barcelona, Spain, June 2008  
**Routing in the Internet and Navigability of Scale-Free Networks**
- *Institute for Cross-Disciplinary Physics and Complex Systems*  
University of Balearic Islands, Palma de Mallorca, Spain, June 2008  
**Routing in the Internet and Navigability of Scale-Free Networks**
- University of Aveiro, Aveiro, Portugal, May 2008  
**What We Know and What We Do Not Know about the Internet**
- *Center for Networked Systems*  
University of California San Diego, San Diego, California, July 2007  
**Generating Realistic Network Traffic and Topologies**
- *DoD GIG Routing and Addressing Workshop*  
SRI International, Arlington, Virginia, February 2007  
**Topology and Routing**
- University Paris Diderot, Paris, France, June 2006  
**dK-series: Systematic Topology Analysis and Generation Using Degree Correlations**
- University Pierre & Marie Curie, Paris, France, June 2006  
**Something We Always Wanted to Know about ASSs: Relationships and Taxonomy**
- University of California Berkeley, Berkeley, California, April 2006  
**Flat Routing on Curved Spaces**
- Microsoft Research, Redmond, Washington, September 2003  
**Compact Routing on Internet-Like Graphs**
- Intel Research, Berkeley, California, September 2003  
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**Compact Routing on Internet-Like Graphs**
- *Midnight Sun Routing Workshop*  
Luleå University of Technology, Luleå, Sweden, June 2002  
**Project for a @Evolution in Data Network Routing:  
the Kleinrock Universe and Beyond**
- [Other talks and slides](#)