

# DEISY MORSELLI GYSI

## 🎓 EDUCATION

2021

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2020

2019

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2015

2017

2013

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2009

2012

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2008

### Northeastern University

Experiential Ph.D. Leadership

📍 Boston, MA, United States

### Leipzig University

Ph.D. Computer Science

📍 Leipzig, Germany

Thesis: Novel Methods For Constructing, Combining And Comparing Co-Expression Networks: Towards Uncovering The Molecular Basis Of Human Cognition. Comitee: Prof. Dr. Peter F. Staedler, Prof. Dr. Katja Nowick, Prof. Dr. Martin Middendorf.

### Norwegian University Of Science And Technology

Visiting Ph.D. Candidate

📍 Trondheim, Norway

Advisor: Prof. Dr. Eivind Almaas

### Federal University Of Parana

B.Sc. Statistics

📍 Curitiba, PR, Brazil

Thesis: Survival Analysis For Long Term Survivors From Colon Cancer. Supervisor: Prof. Dr. Suely Ruiz Giolo.

### Pontifical Catholic University Of Parana

B.Sc. Biotechnology

📍 Curitiba, PR, Brazil

## ✍ RESEARCH EXPERIENCE

now

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2021

### Northeastern University

Center for Complex Network Research

📍 Boston, MA, United States

Associate Research Scientist

- Curation of non-coding genes interactions for assembly of a high quality interactome.
- Development of personalised medicine ML tools for patients with autoimmune diseases.
- Training of graduate students and postdoctoral researchers.



## CONTACT INFO

🌐 [deisygysi.github.io/](https://deisygysi.github.io/)

👤 [deisygysi/](https://deisygysi/)

🐦 [GysiDeisy](https://GysiDeisy)

linkedin [deisy-morselli-gysi](https://in/deisy-morselli-gysi)

## SKILLS

### Programming Languages

R ★★★★★

Python ★★★★

Perl ★★★★

SQL ★★★★

SAS ★★★★

CSS ★★

C ★★

### Languages

Portuguese ★★★★★

English ★★★★★

German ★★★★★

Spanish ★★★★

2021  
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2019

**Northeastern University**  
Center for Complex Network Research  
Postdoctoral Researcher Associated

 Boston, MA, United States

- Member of a team that tested and validated a computational drug-repurposing algorithm for identification of treatments for COVID-19.
- Member of the team that published the Nature cover for the 20th anniversary of the Human Genome Project.
- Curation of disease-gene association databases for assembly of a high quality database.
- Biomarker discovery for non-responders of first-line drugs in patients with autoimmune diseases.
- Training of graduate students and undergraduate students.

now  
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2019

**Brigham And Women's Hospital, Harvard Medical School**  
Channing Division of Network Medicine  
Research Trainee

 Boston, MA, United States

- Development of methodologies for biomarker discovery for early disease diagnose.

now  
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2021

**Us. Department Of Veteran Affairs**  
MAVERIC  
Bioinformatician

 Boston, MA, United States

- Development of methodologies for biomarker discovery for disease progression.

2012  
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2010

**Federal University Of Parana**  
Statistics Department  
Undergraduate Research

 Curitiba, PR, Brazil

2011

**Federal University Of Parana**  
Animal Breeding Institute  
Undergraduate Research

 Curitiba, PR, Brazil

2011  
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2008

**Federal University Of Parana**  
Laboratory of extra-cellular matrix protein biochemistry and poison biotechnology  
Undergraduate Research

 Curitiba, PR, Brazil

2010  
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2008

**Pontifical Catholic University Of Parana**  
Genetics Department  
Undergraduate Research

 Curitiba, PR, Brazil

## PROFESSIONAL EXPERIENCE

2020  
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2019

**NomiX life sciences**  
Scientific Advisor

- Development of methodology for biomarkers in early disease detection.
- Guidance and support for biomarker discovery from omics.
- Training of younger bioinformaticians.

 Boston, MA, United States

2015  
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2014

**Hospital Israelita Albert Einstein**  
Senior Statistician

- Assistance to the research department of the hospital on the statistical analysis for researchers.
- Prepared publications for peer-reviewed journals.
- Statistics consultant for experiment design, descriptive analysis and inference analysis for studies related to the institution.

 Sao Paulo, SP, Brazil

2014   2013	<b>Heart Institute</b> Bioinformatician	 Sao Paulo, SP, Brazil
	<ul style="list-style-type: none"> <li>• Development of methodologies for network comparison.</li> <li>• Pipeline and workflow construction for SNP analysis.</li> <li>• Analysis of transcriptome from different methodologies: RNAseq, microarray.</li> <li>• GWAS analysis for different phenotypes.</li> </ul>	
2013   2011	<b>HSBC Multiple Bank</b> Credit Analyst	 Curitiba, PR, Brazil
	<ul style="list-style-type: none"> <li>• Development, validation and report of statistical models in the context of Basel II (Probability of Default , Loss of Given Default, Exposure at Default) and BAU (Business as usual).</li> <li>• Responsible for modeling Auto Finance portfolio 'Origination' and 'maintenance' models and related documentation.</li> <li>• Anaisis of behavioral variables used in the analysis of credit models, through studies of stability and performance, seeking improvements for new model redevelopments.</li> <li>• Approval of databases for modeling credit development.</li> </ul>	
2013   2010	<b>Easy Stats</b> Co-Founder	 Curitiba, PR, Brazil
	<ul style="list-style-type: none"> <li>• Assistance to statistical analysis for researchers.</li> <li>• Prepared publications for peer-reviewed journals.</li> <li>• Statistics consultant for experiment design, descriptive analysis and inference analysis for academic studies.</li> </ul>	

## TEACHING EXPERIENCE

now   2021	<b>Mini Programming For Evolutionary Biology</b> Free University of Berlin Network Analysis For Biological Systems	 Berlin, Germany
now   2021	<b>Escuela De Verano En Bioinformática</b> National Autonomous University of Mexico Network Science In Biological Systems	 Mexico City, Mexico
now   2018	<b>Programing For Evolutionary Biology Course</b> Free University of Berlin Statistics And Data Analysis	 Berlin, Germany
2020   2018	<b>Programming For Evolutionary Biology Course</b> Free University of Berlin Teaching Assistant	 Berlin, Germany
2017	<b>Programming For Evolutionary Biology Course</b> Leipzig University Statistics And Data Analysis	 Leipzig, Germany
2017   2016	<b>Programming For Evolutionary Biology Course</b> Leipzig University Teaching Assistant	 Leipzig, Germany



## PUBLICATIONS

1. Gates, A.J., **Gysi, D.M.**, Kellis, M., Barabási, A.L. *A wealth of discovery built on the Human Genome Project - by the numbers*, **Nature**. vol. 590, no. 7845 (2021) doi:10.1038/d41586-021-00314-6
2. Kolora, S.R.R., **Gysi, D.M.**, Schaffer, S., Grimm-Seyfarth, A., Szabolcs, M., Faria, R., Henle, K., Stadler, P.F., Schlegel, M., Nowick, K. *Accelerated evolution of tissue-specific genes mediates divergence amidst gene flow in European green lizards*, **Genome Biology and Evolution**. vol. NA, no. NA (2021) doi:10.1093/gbe/evab109
3. **Gysi, D.M.**, do Valle, I., Zitnik, M., Ameli, A., Gan, X., Varol, O., Ghiassian, S.D., Patten, J. J., Davey, R.A., Loscalzo, J., Barabasi, A.L. *Network medicine framework for identifying drug-repurposing opportunities for COVID-19*, **Proceedings of the National Academy of Sciences**. vol. 118, no. 19 (2021) doi:10.1073/pnas.2025581118
4. **Gysi, D.M.**, Nowick, K. *Construction, comparison and evolution of networks in life sciences and other disciplines*, **Journal of The Royal Society Interface**. vol. 17, no. 166 (2020) doi:10.1098/rsif.2019.0610
5. Banos, S. , Gysi, D. M., Richter-Heitmann, T. , Glöckner, F. O., Boersma, M. , Wiltshire, K.H. , Gerdts, G. , Wichels, A. , Reich, M. *Seasonal Dynamics of Pelagic Mytoplanktonic Communities: Interplay of Taxon Abundance, Temporal Occurrence, Biotic Interactions*, **Frontiers in Microbiology**. vol. 11, no. NA (2020) doi:10.3389/fmicb.2020.01305
6. Geffre, A. C., Gernat, T., Harwood, G. P., Jones, B. M., **Gysi, D.M.**, Hamilton, A. R., Bonning, B. C., Toth, A. L., Robinson, G. E., Dolezal, A. G. *Honey bee virus causes context-dependent changes in host social behavior*, **Proceedings of the National Academy of Sciences**. vol. 116, no. 116 (2020) doi:10.1073/pnas.2002268117
7. **Gysi, D.M.**, de Miranda Fragoso, T., Zebardast, F., Bertoli, W., Busskamp, V., Almaas, E., Nowick, K. *Whole transcriptomic network analysis using Co-expression Differential Network Analysis (CoDiNA)*, **PLoS ONE**. vol. 15, no. 10 (2020) doi:10.1371/journal.pone.0240523
8. **Gysi, D.M.**, Voigt, A., Fragoso, T.M., Almaas, E. , Nowick, K. *wTO: an R package for computing weighted topological overlap and a consensus network with integrated visualization tool*, **BMC Bioinformatics**. vol. 19, no. 1 (2018) doi:10.1186/s12859-018-2351-7
9. Kutsche, L.K. , **Gysi, D.M.** , Fallmann, J. , Lenk, K. , Petri, R., Swiersy, A., Klapper, S.D. , Pircs, K. , Khattak, S. , Stadler, P. F. , Jakobsson, J. , Nowick, K. , Busskamp, V. *Combined Experimental , System-Level Analyses Reveal the Complex Regulatory Network of miR-124 during Human Neurogenesis*, **Cell Systems**. vol. 7, no. 4 (2018) doi:10.1016/j.cels.2018.08.011
10. Vaidotas, M., Yokota, P.K.O. and Marra, A.R., Sampaio Camargo, T.Z., Victor, E.D.S., **Gysi, D.M.**, Leal, F., Dos Santos, O.F.P., Edmond, M.B. *Measuring hand hygiene compliance rates at hospital entrances*, **American Journal of Infection Control**. vol. 43, no. 7 (2015) doi:10.1016/j.ajic.2015.03.008



## SUBMITTED / IN PREPARATION PUBLICATIONS

1. **Gysi, D.M.**, Nowick, K. *Network Analysis Tutorial: From differential Expression to Differential co-expression network*. (2021).
2. **Gysi, D.M.**, Nowick, K. *Understanding human cognition using TF-networks: Identifying signature genes for psychotic and neurodevelopmental disorders through a gene-co-expression networks approach*. (2021).
3. Ahmed, O.S., Chatterjee, A., Walters, R., Shafi, Z., **Gysi, D.M.**, Yu, R., Eliassi-Rad, T., Barabasi, A.L., Menichetti, G *Improving Neural Network Binding Predictions for Novel Protein Targets*. (2021).
4. Vasan, K., **Gysi, D.M.**, Barabasi, A.L. *Maximizing drug target exploration in clinical trials*. (2021).
5. Pimpao, F., **Gysi, D.M.**, Castro, D., Ferreira, T.B. *The Nosographic Network Structure of Posttraumatic Stress Disorder*. (2021).
6. Dumack, K., Olga, F., Gysi, D. M., Jauss, R.T., Walden, S., Hüsna, O. , Wubet, T., Michael, B., Eisenhauer, N. *Effects of earthworm invasion on the diversity of protists (Cercozoa: Rhizaria) in North American*. (2021).
7. Patten, J.J., Keiser, P. T., **Gysi, D.M.**, Menichetti, G., Mori, H., Donahue, C. J., Gan, X., Do Valle, I., Geoghegan-Barek, K., Anantpadma, M., Berrigan, J. L., Jaliloh, S., Ayazika, T., Wagner, F., Zitnik, M., Ayehunie, S., Anderson, D., Loscalzo, J., Gummuluru, S., Namchuk, M. N., Barabasi, A. L., Davey, R. A. *Multidose evaluation of 6,710 drug repurposing library identifies potent SARS-CoV-2 infection inhibitors In Vitro and In Vivo*. (2021).

## INVITED TALKS

1. Gysi, D.M. *Network Medicine for Rheumatoid Arthritis EULAR*, Paris, France (2021).
2. Gysi, D.M. *Network Medicine Framework for Identifying Drug Repurposing Opportunities for COVID-19 ALERT*, Boston, United States (2020).
3. Gysi, D.M. *Network Medicine approaches for the study of SARS-CoV2 and drug repurposing Drug-Design - RSG-Brazil*, Sao Paulo, Brazil (2020).
4. Gysi, D.M., Valle, I. *Network Medicine Framework for Identifying Drug Repurposing Opportunities for COVID-19 PUB Boston*, Boston, United States (2020).
5. Gysi, D.M., Valle, I. *Network Medicine Framework for Identifying Drug Repurposing Opportunities for COVID-19 Statistics Department*, Curitiba, Brazil (2020).

## TALKS

1. Gysi, D.M. *Comparing multiple co-expression networks* 4th Summer School in Complex Networks, Como, Italy (2018).
2. Gysi, D.M. *Co-expression Differential Network Analysis* XXIX International Biometric Conference, Barcelona, Spain (2018).
3. Gysi, D.M. *wTO: an R package to calculate weighted topological overlap networks* XIV Herbstseminar der Bioinformatik, Doubice, czech republic (2016).
4. Gysi, D.M. *Evolution of gene co-expression networks implicated in cognitive functions in primates* XIII Herbstseminar der Bioinformatik, Doubice, czech republic (2015).

## POSTER PRESENTATION

1. Wells, A., Gysi, D.M., Barabási, A.L. *Human Gene Expression and the Protein-Protein Interaction Network: Identification of Potential Disease Module Association to Differential Gene Expression for Patient-to-Drug Matching* American Physical Society, NA, United States (2020).
2. Gysi, D.M., Fragoso, T. M. , Almaas, E. , Nowick, K. *How to build and compare co-expression networks* BenGenDiv, Berlin, Germany (2018).
3. Gysi, D.M., Voigt, A. , Fragoso, T. M. , Almaas, E. , Nowick, K. *An R package for calculating the Weighted Topological Overlap Network with a visualization tool Complenet18*, Boston, United States (2018).
4. Kutsche, L. K., Gysi, D.M., Lenk, K., Petri, R., Jakobsson, J., Nowick, K., Busskamp, V. *A systems level view on miR-124 function during neuronal differentiation from human iPS cells* Gene regulatory mechanisms in neural fate decisions, San Juan de Alicante, Spain (2017).
5. Kutsche, L. K., Gysi, D.M., Lenk, K., Petri, R., Jakobsson, J., Nowick, K., Busskamp, V. *A systems level view on miR-124 function during neuronal differentiation from human iPS cells* Intelligent Systems for Molecular Biology, Prague, czech republic (2017).
6. Gysi, D.M., Voigt, A. , Fragoso, T. M. , Almaas, E. , Nowick, K. *wTO: an R package for computing the weighted Topological Overlap and Consensus Networks* NORBIS annual conference, Tromso, Norway (2017).
7. Bertoli, W., Gysi, D.M.. *Bayesian Estimation of the Zero-Inflated quasi Poisson-Lindley Model* 4th Workshop on Probabilistic and Statistical Methods, Sao Carlos, Brazil (2016).
8. Gysi, D.M., Pilar, P. G., Giolo, S. R. *Modelo de Sobrevida com Fração de Cura Aplicado aos Dados de Pacientes com Câncer de Colo do Útero IV WASA – Workshop em Analise de Sobrevida e Aplicações*, Belo Horizonte, Brazil (2015).
9. Bertoli, W., Gysi, D.M. *Métodos Estatísticos na Análise de Dados Genômicos* Workshop on Probabilistic and Statistical Methods, Sao Carlos, Brazil (2013).
10. Gysi, D.M., Pilar, P. G., Giolo, S. R. *Análise da sobrevida de pacientes com câncer do colo do útero* XIII Escola de Modelos de Regressão, Maresias, Brazil (2013).
11. Bertoli, W., Gysi, D.M. *Análise de Componentes Principais Para Obtenção de Grupos de SNPs Informativos*. VI Bienal da Sociedade Brasileira de Matemática, Curitiba, Brazil (2012).

- Gysi, D.M., Giolo, S. R. *Metodologias Estatísticas Aplicadas à Genética Quantitativa e Genômica*. Encontro de Iniciação Científica da UFPR, Curitiba, Brazil (2012).
13. Gysi, D.M., Giolo, S. R. *Estatística Computacional em Genética Quantitativa e Genômica*. Encontro de Iniciação Científica da UFPR, Curitiba, Brazil (2011).
  14. Gysi, D.M., Rakin, S., Saez, R. *Elaboração de um banco de Dados de DNA de pacientes com fissura lábio palatina não sindrômica*. XVIII Seminário de Iniciação Científica – PUC-PR, Curitiba, Brazil (2010).
  15. Novelino, A., Rakin, S., Gysi, D.M., Saez, R., Grabowski, M., Souza, J. *Elaboração de banco de DNA de pacientes com fissuras labiopalatais*. XVII Seminário de Iniciação Científica – PUC-PR, Curitiba, Brazil (2009).
  16. Gysi, D.M., Rakin, S., Saez, R., Grabowski, M., Souza, J., Novelino, A. *Elaboração de banco de dados epidemiológico* XVII Seminário de Iniciação Científica – PUC-PR, Curitiba, Brazil (2009).

## R-PACKAGES

1. Gysi, D.M. *NetSci: Tools for quantitative analysis in Network Science* (2021). [CRAN](#).
2. Gysi, D.M., de Miranda Fragoso, T., Busskamp, V., Almaas, E., Nowick, K. *CoDiNA: Co-Expression Differential Network Analysis* (2019). [CRAN](#).
3. Gysi, D.M. *RichR: Enrichment for Diseases in a Set of Genes* (2019). [CRAN](#).
4. Gysi, D.M., Voigt, A., Fragoso, T.M., Almaas, E., Nowick, K. *wTO: Computing Weighted Topological Overlaps (wTO) and Consensus wTO Network* (2018). [CRAN](#).

## INTELLECTUAL PROPERTY

1. Gysi, D.M., Barabasi, A.L. *COVID-19 Drug Repurposing Candidates* (2021).
2. Gysi, D.M., Barabasi, A.L. *TULIP: Transcriptome Profiling for Discovery of Biomarker* (2020).
3. Gysi, D.M., Barabasi, A.L. *PEONY: Personalized Diagnostic Tool for Complex Phenotypes from RNA Biomarkers* (2020).

## SERVICE

### REVIEWER

- 2019 - now Tree Genetics and Genomes.
- 2020 - now Genome Medicine.
- 2020 - now Molecular Biology and Evolution.
- 2020 - now PNAS.
- 2020 - now BMC Systems Biology.
- 2020 - now Plos Computational Biology.
- 2020 - now Genes.
- 2020 - now Viruses.

### SOCIETIES

- 2017 - 2019 R-Ladies chapter Leader: Leipzig.
- 2018 - 2019 Representative of Caucus women in Statistics - Germany.
- 2019 - now Active member of Boston Area Pharmaceutical Statistics and Data Science Group.
- 2019 - now Active member of Boston R-Ladies.
- 2021 - now Women in Network Science.