






# DEISY MORSELLI GYSI

Network Science | Bioinformatics | Statistics | Biotechnology

*Ph.D. in Computer Science. Bioinformatician and Statistician with a solid background in Biotechnology. Extensive experience with Network Science, Big Data, genomics, transcriptomics, and method development for network analysis. Passionate about complex systems. Independent Consultant for statistics in Medical Science. Organized, communicative, creative, and fast learner with outstanding writing skills. Works well in teams and alone.*

## EDUCATION

- |                   |   |   |
|-------------------|---|---|
| 2021<br> <br>2020 | <b>Northeastern University</b><br>Experiential Ph.D. Leadership   |  Boston, MA, United States |
| 2019<br> <br>2015 | <b>Leipzig University</b><br>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. |   |
| 2017              | <b>Norwegian University Of Science And Technology</b><br>Visiting Ph.D. Candidate   |  Trondheim, Norway       |
|                   | Advisor: Prof. Dr. Eivind Almaas  |   |
| 2013<br> <br>2009 | <b>Federal University Of Parana</b><br>B.Sc. Statistics   |  Curitiba, PR, Brazil    |
|                   | Thesis: Survival Analysis For Long Term Survivors From Colon Cancer. Supervisor: Prof. Dr. Suely Ruiz Giolo.  |   |
| 2012<br> <br>2008 | <b>Pontifical Catholic University Of Parana</b><br>B.Sc. Biotechnology  |  Curitiba, PR, Brazil    |

## RESEARCH EXPERIENCE

- |                  |  |   |
|------------------|--|---|
| now<br> <br>2019 | <b>Harvard Medical School - Brigham And Women's Hospital</b><br>Channing Division of Network Medicine                            |  Boston, MA, United States |
|                  | Research Trainee   |   |
|                  | <ul style="list-style-type: none"><li>Development of methodologies for biomarker discovery for early disease diagnose.</li></ul> |   |



## CONTACT INFO

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

 [deisygysi/](https://github.com/deisygysi/)

 [GysiDeisy](https://twitter.com/GysiDeisy)

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

## SKILLS

### Programming Languages

R ★★★★★

Python ★★★★★

Perl ★★★★★

SQL ★★★★★

SAS ★★★★★

CSS ★★★★★

C ★★★★★

### Languages

Portuguese ★★★★★

English ★★★★★

German ★★★★★

Spanish ★★★★★

*Last updated on 2022-04-03.*

now  
|  
2021

**Northeastern University**  
Center for Complex Network Research  
Associate Research Scientist

📍 Boston, MA, United States

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

now  
|  
2021

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

📍 Boston, MA, United States

- Development of methodologies for biomarker discovery for disease progression.

2021  
|  
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.

2012  
|  
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

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

📍 Curitiba, PR, Brazil

2010  
|  
2008

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

📍 Curitiba, PR, Brazil

## PROFESSIONAL EXPERIENCE

2020  
|  
2019

**NomiX life sciences**  
Scientific Advisor

📍 Boston, MA, United States

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

- 2015  
|  
2014
- Hospital Israelita Albert Einstein**  
Senior Statistician 📍 Sao Paulo, SP, Brazil
- 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.
- 2014  
|  
2013
- Heart Institute**  
Bioinformatician 📍 Sao Paulo, SP, Brazil
- Development of methodologies for network comparison.
  - Pipeline and workflow construction for SNP analysis.
  - Analysis of transcriptome from different methodologies: RNAseq, microarray.
  - GWAS analysis for different phenotypes.
- 2013  
|  
2010
- Easy Stats**  
Co-Founder 📍 Curitiba, PR, Brazil
- Assistance to statistical analysis for researchers.
  - Prepared publications for peer-reviewed journals.
  - Statistics consultant for experiment design, descriptive analysis and inference analysis for academic studies.
- 2013  
|  
2011
- HSBC Multiple Bank**  
Credit Analyst 📍 Curitiba, PR, Brazil
- 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).
  - Responsible for modeling Auto Finance portfolio 'Origination' and 'maintenance' models and related documentation.
  - Analysis of behavioral variables used in credit models, studies of stability and performance, improvements of new models.
  - Approval of databases for modeling credit development.

## PUBLICATIONS

- \* denotes the authors contributed equally
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 , IF: 49.96.
  2. 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 , IF: 11.2.
  3. 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. 19, no. 116 (2020) doi:10.1073/pnas.2002268117 , IF: 11.2.
  4. 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 , IF: 10.34.
  5. Banos, S. , Gysi, D. M., Richter-Heitmann, T. , Glöckner, F. O., Boersma, M. , Wiltshire, K.H. , Gerdt, G. , Wichels, A. , Reich, M. *Seasonal Dynamics of Pelagic Mycoplanktonic Communities: Interplay of Taxon Abundance, Temporal Occurrence, , Biotic Interactions*, **Frontiers in Microbiology**. vol. 11 (2020) doi:10.3389/fmicb.2020.01305 , IF: 5.64.
  6. 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 , IF: 4.11.
  - 7.

- Pimpao, F., **Gysi, D.M.**, Castro, D., Ferreira, T.B. *The Nosographic Network Structure of Posttraumatic Stress Disorder*, **Journal of Traumatic Stress** (2022) , **IF: 3.47**.
8. 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** (2021) doi:10.1093/gbe/evab109 , **IF: 3.41**.
9. **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 , **IF: 3.24**.
10. **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 , **IF: 3.16**.
11. 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*, **Biological Invasions** (2022) doi:10.1007/s10530-021-02726-x , **IF: 3.13**.
12. 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 , **IF: 2.95**.

## SUBMITTED OR IN PREPARATION PUBLICATIONS

1. Vasan, K., **Gysi, D.M.**, Barabasi, A.L. *Maximizing drug target exploration in clinical trials*. (2022).
2. Patten, JJ, 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., Jalloh, 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*. (2022).
3. Widocki, U., **Gysi, D.M.**, Barabasi, A.L. *The underlying systems biology of Autoimmune Diseases*. (2022).
4. **Gysi, D.M.** *NetSci: An R package for quantitative analysis in Network Medicine*. (2022).
5. **Gysi, D.M.**, Barabasi, A.L. *Can non-coding RNAs improve predictions from network medicine?*. (2022).
6. **Gysi, D.M.**, Weiss, S., Barabasi, A.L. *miRNAs in umbilical cord blood as predictors of early childhood diseases*. (2022).
7. **Gysi, D.M.**, Barabasi, A.L. *Can non-coding RNAs improve predictions from network medicine?*. (2022).
8. **Gysi, D.M.**, Barabasi, A.L. *Personalised Medicine using Network Medicine for auto-immune disease*. (2022).
9. **Gysi, D.M.**, Nowick, K. *Network Analysis Tutorial: From differential Expression to Differential co-expression network*. (2021).
10. **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).
11. Ahmed, O.S., Chatterjee, A., Walters, R., Shafi, Z., **Gysi, D.M.**, Yu, R., Eliassi-Rad, T., Barabasi, A.L., Menichetti, G *AI-Bind: Improving Binding Predictions for Novel Protein Targets and Ligands*. (2021).

## INVITED TALKS

1. **Gysi, D.M.** *Network Medicine & Drug Repurposing in Times of Pandemic II Semana de la Biología Computacional*, Mexico City, Mexico (2022).
2. **Gysi, D.M.** *Network Medicine for Rheumatoid Arthritis EULAR*, Paris, France (2021).
3. **Gysi, D.M.** *Drug repurposing for treating diseases: a network medicine approach Brazilian Symposium in Bioinformatics - 2021*, Brasilia, Brazil (2021).
4. **Gysi, D.M.** *Network Medicine Framework for Identifying Drug Repurposing Opportunities for COVID-19 ALERT*, Boston, United States (2020).

- Gysi, D.M. *Network Medicine approaches for the study of SARS-CoV2 and drug repurposing* **Drug-Design - RSG-Brazil**, Sao Paulo, Brazil (2020).
6. Gysi, D.M., Valle, I. *Network Medicine Framework for Identifying Drug Repurposing Opportunities for COVID-19* **PUB Boston**, Boston, United States (2020).
7. Gysi, D.M., Valle, I. *Network Medicine Framework for Identifying Drug Repurposing Opportunities for COVID-19* **Statistics Department**, Curitiba, Brazil (2020).

## CONTRIBUTED 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* **CompleNet'18**, 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 Sobrevivência com Fração de Cura Aplicado aos Dados de Pacientes com Câncer de Colo do Útero* **IV WASA - Workshop em Análise de Sobrevivência 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).
12. 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).

Gysi, D.M., Rakin, S., Saez, R. *Elaboração de um banco de Dados de DNA de pacientes com fissura lábio palatina não síndrômica*. 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).

## MENTORING EXPERIENCE

1. Ursula Widowski. *The Role of the Immune System Network Into Different Classes of Diseases and Their Affected Metabolic Pathways*. Northeastern University. Boston - MA, EUA (PhD Candidate, 2020 - 2024).
2. Kishore Vasan. *Quantifying Drug Target Exploration in Clinical Trials*. Northeastern University. Boston - MA, EUA (PhD Candidate, 2020 - 2024).
3. Jyothika Boddu. *Personalized Medicine for Patients with Rheumatoid Arthritis Treated with Biological Drugs Using RNAseq*. Northeastern University. Boston - MA, EUA (Masters in Bioinformatic, 2021 - 2021).
4. Darshita Patel. *Identification of Differential Transcriptomic Profile in Patients with Rheumatoid Arthritis*. Northeastern University. Boston - MA, EUA (Masters in Bioinformatic, 2020 - 2020).
5. Nicolette Lee. *Drug-target Identification, under and overrepresentation*. Northeastern University. Boston - MA, EUA (Masters in Bioinformatic, 2020 - 2020).
6. Joey Ehlert. *Personalized Medicine for Patients with Rheumatoid Arthritis Treated with Non Biological Drugs Using Multi-omics*. Northeastern University. Boston - MA, EUA (Undergraduate Research, 2021 - 2021).
7. Aydin Wells. *Identification of Potential Disease Module Association to Differential Gene Expression for Patient-to-drug Matching*. Northeastern University. Boston - MA, EUA (Undergraduate Research, 2019 - 2020).

## TEACHING EXPERIENCE

now   2018	<b>Programing For Evolutionary Biology Course</b> Free University of Berlin Statistics And Data Analysis	 Berlin, Germany
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
2020   2018	<b>Programing For Evolutionary Biology Course</b> Free University of Berlin Teaching Assistant	 Berlin, Germany
2017   2016	<b>Programing For Evolutionary Biology Course</b> Leipzig University Teaching Assistant	 Leipzig, Germany

2017

## Programing For Evolutionary Biology Course

Leipzig University  
Statistics And Data Analysis

Leipzig, Germany

### INTELLECTUAL PROPRIETY

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).

### 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](#).

### SERVICE

#### ORGANIZED EVENTS

- Mini Programming for Evolutionary Biology (Free University of Berlin, Berlin, Germany). 2021
- Artificial Intelligence for Graphs Study Group (Northeastern University, Boston, USA). 2019 - 2021
- Network Medicine Hackathon (Northeastern University, Boston, USA). 2022

#### 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**.
- 2021 - now **Frontiers in Bioinformatics**.
- 2021 - now **IEEE/ACM Transactions on Computational Biology and Bioinformatics**.
- 2021 - now **Computers in Biology and Medicine**.

#### 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**.

#### HONORS

- 2012 UFPR Brazil
  - **Best Undergraduate Research**.

- 2011 UFPR Brazil
  - **Best Undergraduate Research.**

#### FELLOWSHIPS

- 2015 - 2019 CNPq Brazil
  - **Ph.D.** - Fellowship awarded for a 36 months Ph.D. in Germany
- 2015 DAAD Germany
  - **German Course.** - Fellowship awarded for a 6 months course of German language
- 2010 - 2012 CNPq - UFPR Brazil
  - **Undergrad Research.** - Fellowship awarded for 24 months undergrad research
- 2008 - 2010 CNPq - PUCPR Brazil
  - **Undergrad Research.** - Fellowship awarded for 24 months undergrad research