Felipe I. **Figueroa-Tapia**

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felipefigueroat | 0000-0001-9735-6051 | Felipe-Figueroa-Tapia

Astronomer and MSc. in Astrophysics student at Universidad de Valparaíso. Member of the Massive Stars Group of the Instituto de Física y Astronomía (IFA UV)

Education

MSc. in Astrophysics — *April, 2023 - Currently*
Universidad de Valparaíso, Valparaíso — *Chile*

BSc. in Physics, with a specialization in Astronomy — *March, 2018 - December, 2022*
Universidad de Valparaíso, Valparaíso — *Chile*

- Thesis: Self-consistent formulae for theoretical mass-loss rate and terminal velocity of O-type stars
- Advisor: Dr. Michel Curé, Co-Advisors: Dr. Ignacio Araya, Dr. Jorge Panei, Dr. Catalina Arcos.
- Courses: Databases | Machine Learning & Artificial Inteligence | Python & Julia Programming

Research Experience

Winds from massive stars in spherical and oblate geometries — *April, 2023 - Currently*
Universidad de Valparaíso — *Valparaíso, CL*

- Research Assistant, lead by Prof. Dr. Michel Curé & Prof. Dr. Catalina Arcos.
- FONDECYT Regular No. 1230131.
- Development of theoretical stellar models using UNIX servers and NLHPC (National Laboratory for High Performance Computing).
- Analysis, management, and reduction of data obtained using Python (NumPy, Pandas, Matplotlib, Seaborn) and Julia, through Jupyter.
- Completion of Master's thesis during this project.

Long-term variability in Be stars: features of the outer disks — *December, 2021 - January, 2023*
Universidad de Valparaíso — *Valparaíso, CL*

- Research Assistant, lead by Prof. Dr. Catalina Arcos.
- Research assistant within the framework of FONDECYT Iniciación No. 11190945.
- Development of theoretical stellar models using UNIX servers.
- Comparison of modeled data with observations obtained from the BeSOS database.

Winds from Massive Stars — *December, 2019 - January, 2023*
Universidad de Valparaíso — *Valparaíso, CL*

- Research Assistant, lead by Prof. Dr. Michel Curé
- FONDECYT Regular No. 1190485.
- Acquisition of theoretical models using UNIX servers.
- Handling large amounts of data using Python (NumPy, Pandas, Matplotlib, Seaborn), Julia, and Wolfram Language, through Jupyter.
- Completion of undergraduate thesis during this project.

Decretion disks and Outflows around Fast-Spinning Stars — *April, 2020 - December, 2022*
Universidad de Valparaíso — *Valparaíso, CL*

- Research Assistant, lead by Prof. Dr. Catalina Arcos and Prof. Dr. Michel Curé.
- CONICYT Chile – FAPESP Brazil N° 13354-1.
- Creation of theoretical models using the National Laboratory for High Performance Computing (NLHPC).
- Analysis of the star HD45725 with observational data from various telescopes, utilizing time series and machine learning in Python.

Quiescent State of Cataclysmic Variables — *April, 2020 - December, 2022*
Universidad de Valparaíso — *Valparaíso, CL*

- Research Assistant, lead by Prof. Dr. Nikolaus Vogt.
- Creation of a database of light curves of cataclysmic variables (CVs), implementing a semi-automatic download and filtering code from the Gaia mission database.
- Analysis of the data obtained from the database, studying changes in brightness over significant time scales, specifically focusing on long-term variations.

Teaching Experience

As Professor

Professor of the Astronomy Workshop, ECIVAL — *8-12 de Enero, 2024*
Universidad de Valparaíso — *Valparaíso, CL*

- Workshop conducted for high school students in the Valparaíso Region.
- Development of educational strategies to promote scientific research among high school students.
- The workshop consisted of obtaining theoretical stellar models using UNIX-based codes for subsequent analysis.

- Tools for data management using Python were taught, including libraries such as NumPy, Pandas, and Matplotlib.

Professor of the Laboratory of Newtonian Mechanics — *August - December, 2023*
Universidad de Valparaíso — *Valparaíso, CL*

- Course taught to a group of approximately 15 students in the Bachelor's Degree in Science program.
- It consisted of biweekly experiments, with their respective reports in the form of scientific publications.
- Approximately 90% of the total group passed the course.

As Teaching Assistant

BSc. in Physics – Electromagnetism Course — *March - August, 2020*
Universidad de Valparaíso — *Valparaíso, CL*

- Position held under the APPA project (Preferential Attention to First Years) for the BSc. in Physics program.
- Support classes provided to a group of approximately 50 students.
- Increase in the passing rate of approximately 10% from previous years.

BSc. in Physics – Computational Physics Course — *March - August, 2020*
Universidad de Valparaíso — *Valparaíso, CL*

- Position held for BSc. in Physics students.
- Provide weekly support to a group of approximately 30 students by conducting exercises and Wolfram Mathematica classes, applying programming solutions to physical problems.

BSc. in Physics – Modern Physics Laboratory Course — *August - December, 2021*
Universidad de Valparaíso — *Valparaíso, CL*

- Position held for BSc. in Physics students.
- Support provided to the lead professor for a group of approximately 15 students, reviewing reports weekly and providing relevant feedback to each group.
- Improved outcomes compared to previous years.

BSc. in Physics – Newtonian Mechanics Course — *August - December, 2021*
Universidad de Valparaíso — *Valparaíso, CL*

- Position held under the APPA project for the BSc. in Physics program.
- Conducted exercise classes for a group of approximately 15 students. In addition to this, individual follow-up was provided to each student.
- Highest passing rate of the total course.

Programming Skills

Programming	Python (Pandas/NumPy/Seaborn/Scikit-Learn) | Julia | Wolfram Mathematica | SQL | Linux/UNIX | Github
Astronomical Software	IRAF | Ds9 | ECLIPSE | LOCUS | HydWind | FastWind | HDust | Tlusty | Genec | MESA

Conferences/Schools

XVIII Annual Meeting of the Chilean Astronomical Society (SOCHIAS) — *13 - 16 March, 2023*
Universidad de la Frontera (UFRO) — *Temuco, CL*

- Poster: Hydrodynamic disk solutions for Be stars using HDUST

IV Jornadas de Astrofísica Estelar — *22 - 24 June, 2022*
Universidad de San Pablo-Tucumán (USP-T) — *San Miguel de Tucumán, AR*

- Poster: Disk time evolution of the Be Star HD45725

XVII Annual Meeting of the Chilean Astronomical Society (SOCHIAS) — *17 - 21 January, 2022*
Chile — *Online, CL*

- Poster: Determination of Disk Parameters of the Be Star HD45725

I Annual Meeting of the Massive Stars Group (IFA UV) — *7 January, 2022*
Universidad de Valparaíso (UV) — *Valparaíso, CL*

- Talk: Obtención de Parámetros de Línea Autoconsistentes

La Serena School of Data Science (LSSDS) — *2 - 13 August, 2021*
AURA Observatory — *Online, CL*

- Accepted with a full scholarship given by AURA Observatory to attend LSSDS

XVI Annual Meeting of the Chilean Astronomical Society (SOCHIAS) — *9-11 December, 2020*
Chile — *Online, CL*

- Poster: Obtaining stellar parameters using a self-consistent m-CAK procedure

V Workshop Anual del Instituto de Física y Astronomía (IFA UV) — *1-2 November, 2020*
Universidad de Valparaíso (UV) — *Valparaíso, CL*

- Poster: Recuperando la Tabla de Abbott

Outreach Activities

Public Talk: ¿Cómo es la vida de las estrellas masivas? *26 January, 2024*
Museo de Arqueología e Historia Francisco Fonck *Viña del Mar, CL*
- Public talk about the life, from birth to death, of massive stars and their posterior supernova.

Workshop: Escuela de Ciencias de Valparaíso (ECIVAL UV) *8 - 12 January, 2024*
Universidad de Valparaíso (UV) *Valparaíso, CL*
- Teacher and mentor for science workshop organized by the Facultad de Ciencias of the Universidad de Valparaíso for chilean highschoolers.

Public Talk: ”Licenciatura en Física y sus Menciones” *24 August, 2023*
Universidad de Valparaíso (UV) *Valparaíso, CL*
- Talk about the BSc. in Physic program at Universidad de Valparaíso to highschoolers during a visit from Liceo Luís Urbina.

Public Talk: ”El Universo y su Expansión” *20 June, 2023*
Colegio Montesol 2 *Quilpué, CL*
- Talk about the expansion of the universe and a historical review of the theory to primary students.

Public Activity: Puertas Abiertas Facultad de Ciencias 2023 *13 June, 2023*
Universidad de Valparaíso (UV) *Valparaíso, CL*
- Activity lead by the Universidad de Valparaíso, during a visit of multiple high schools.

Public Discussion: ”Licenciatura en Física en la Universidad de Valparaíso” *24 May, 2023*
Colegio Montemar *Viña del Mar, CL*
- Discussion made with highschool students about the life as a physics student, during the framework of ”Programa de Charlas de Divulgación y Promoción Científica al sistema escolar”, lead by the Universidad de Valparaíso.

Public Activity: ”Verano de Estrellas” *3 May, 2023*
Teatro Pompeya *Villa Alemana, CL*
- Support staff during the activity, lead by the Instituto de Física y Astronomía (IFA UV).

Public Talk: ”Experiencia en la Carrera de Astronomía” *19 August, 2022*
Colegio Los Leones *Quilpué, CL*
- Vocational talk for highschool students about the life of a astronomy student. Activity leaf by 3ro Medio.

Public Talk: ”Historia de la Astronomía” *2021*
Junta de Vecinos “Palermo” *Villa Alemana, CL*
- Public talk to children about the historical context of Astronomy.

President of the Electoral Tribunal of BSc. in Physics *2021 - 2022*
Universidad de Valparaíso (UV) *Valparaíso, CL*
- President of the board in charge of the elections for the student council board.

Public Activity: Total Solar Eclipse 2019 *2 July, 2019*
Instituto de Física y Astronomía UV *Cachiyuyo, CL*
- Support staff during the activity, lead by the Instituto de Física y Astronomía (IFA UV).

Languages

Spanish Native level
English Fluent - Intermediate level | EFSET (Reading/Listening) C2 Proficient

Publications & Proceedings

Figueroa-Tapia, F., Arcos, C., Curé, M., & Araya, I. (2023). Disk Time Evolution of the Be star HD 45725. *Actas De Las Cuartas Jornadas De Astrofísica Estelar, AAA Workshop Series*, *13*, 153–154.

Förster, F., Muñoz Arancibia, A. M., Reyes-Jainaga, I., Gagliano, A., Britt, D., Cuellar-Carrillo, S., Figueroa-Tapia, F., Polzin, A., Yousef, Y., Arredondo, J., Rodríguez-Mancini, D., Correa-Orellana, J., Bayo, A., Bauer, F. E., Catelan, M., Cabrera-Vives, G., Dastidar, R., Estévez, P. A., Pignata, G., … Silva-Farfán, J. (2022). DELIGHT: Deep Learning Identification of Galaxy Hosts of Transients using Multiresolution Images. *Apj*, *164*(5), 195–196. https://doi.org/10.3847/1538-3881/ac912a

Gormaz-Matamala, A., Curé, M., Lobel, A., Panei, J., Cuadra, J., Araya, I., Arcos, C., & Figueroa-Tapia, F. (2022). New self-consistent wind parameters to fit optical spectra of O-type stars observed with the HERMES spectrograph. *A&A*, *661*, A51. https://doi.org/10.1051/0004-6361/202142383