

PERSONAL INFORMATION **Ficuț-Vicaș Dana**

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Sex Female | **Date of Birth** 07/03/1982 | **Nationality** Romanian

CURRENT PLACE OF WORK (2015-now)

Scientific Researcher

(specialized in Astrophysics in the radio domain)

Romanian Academy, Cluj-Napoca Branch

Astronomical Observatory Cluj-Napoca

Cireșilor, no. 19, 400487, Cluj-Napoca, Cluj, Romania

WORK EXPERIENCE

(2017 - now) I diversified my research activity by adding the astronomy education research component. During the masters program “Curricular management” I learned and practiced designing programs and activities for all types of age groups and curricular contexts some to teach astronomy in schools but most using astronomy to respond to the curricular needs of students. According to the Astronomical Institute of the Romanian Academy classification, the AER component amounting to 25% of my research activity falls under Project III.1.3 **Studies on astronomy teaching methodology** of Programe III called **Studies Of History and Astronomy Education**.

(2015 - now) I work as a scientific researcher, specialized in Astrophysics in the radio domain at the Astronomical Observatory Cluj-Napoca of the Romanian Academy, Cluj-Napoca Branch. My research activity falls under Project I.3 **Studies on extragalactic astronomy and cosmology** of Programe I called **Research in solar physics, stellar, galactic and extragalactic astrophysics and cosmology** as classified by the Astronomical Institute of the Romanian Academy.

- (2017 - 2019) I participated in the following research grant:
 ROSA Consortium Contract No. : 11 PS /20.11.2017
 “ARGOSS: Development of the capabilities of monitoring and coordinating the space surveillance activity for risk assessment associated with the fall of natural and artificial objects from the atmosphere or cosmos”
- (2014 - 2016) I participated in the following international research grant:
 ESA Contract No. 4000114740/15/NL/MM
 EGEP ID 89.26 - GNSS Evolution Scientific and Innovative Technology
 Research Announcement of Opportunity (AO)
 “TELEGAL: Angular Position Measurement of Galileo Satellite with Telescope
- (2012 - 2015) I worked as an assistant researcher at the Astronomical Observatory Cluj-Napoca of the Romanian Academy, Cluj-Napoca Branch .
- (2010 - 2012) Internship at NRAO, Socorro, New Mexico, USA which allowed me to learn and master advanced techniques of radio interferometrical data calibration and analysis.
Supervisor: Dr. Michael Rupen
- (2007 - now) Joined the LITTLE THINGS Survey Team, preparing and undertaking radio observations, data reduction and analysis of dwarf galaxies. At the moment I am working on publishing the scientific results obtained during this collaboration and my PhD project.
- (2006-2007) Joined the project ”**The Neutral Interstellar Medium in Early-Type Galaxies**” under the supervision of Dr. Michael Dahlem (ATNF) and Prof. Dr. Elias Brinks (Hertfordshire University)
- (June - August 2006) Internship at Astron/JIVE, Dwingeloo Observatory, Netherlands
Project: Polar Ring Galaxies
Supervisors: Dr. James Anderson and Dr. Subhashis
- (June - July 2005) Summer internship at the Purple Mountain Observatory, Nanjing, China
Project: High mass X-ray binaries
Supervisor: Prof. Dr. Liu QingZhong
- (April - May 2005) Nanjing University, Astronomy Department , projects competition: my proposed project on **Variable Stars Observations** was selected for implementation.

EDUCATION and TRAINING

- (2017 - now) Babes Bolyai University, Cluj, Romania
MSc – Curricular Management (close to graduation)
Thesis: **Astronomy as an integrating core in the inter- and transdisciplinary approach of the curriculum and the educational programmes**
Supervisors: Prof. Livia Georgeta Suciu
- (2007 - 2015) University of Hertfordshire, Hatfield, U.K.
PhD – An analysis of LITTLE THINGS (2015)
Thesis: **Star Formation in LITTLE THINGS Dwarf Galaxies**
Supervisors: Prof. Dr. Elias Brinks,
Dr. Antonio Usero, Dr. Volker Heesen, Dr. Michael Rupen
- (2006 - 2007) Babes Bolyai University, Cluj, Romania
MSc – Mathematical models in mechanics and astronomy(2007)
Thesis: **The Interstellar Medium in Early-Type Galaxies**
Supervisors: Prof. Elias, Brinks, Dr. Cristina Blaga
- (2001 - 2006) Nanjing University, China
BS-Astronomy(2006)
Thesis: **The Study of The Massive X-ray Binary LSI+65010**
Supervisor: Prof. Dr. Liu QingZhong
- (2001-2002) Worked on a project on “Solar Activity” supervised by Csillik Iharka at the Astronomical Observatory Cluj Napoca, Romania
- (2000 - 2001) Babes Bolyai University, Cluj-Napoca, Romania
BS- Mathematics –aimed at specializing in astronomy; at the completion of the first year I was awarded a scholarship for complete studies in astronomy in China.
- (1996 - 2000) Theoretical High School, Zalau Romania
Computer Science Specialization

PERSONAL SKILLS

Mother Tongue **Romanian**

Other Languages(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken Interaction	Spoken Production	
English	C1	C1	C1	C1	C1
Chinese	B2	B1	B2	B1	A2
Spanish	A1	A1	A2	A2	A2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user
Common European Framework of Reference for Languages

Computer Skills

Programming:

Programming skills in C Language, Turbo Pascal, Matlab.

Experience working with astronomy oriented software like AIPS, IDL, IRAF.

Basic knowledge of CASA.

Web design in Html and Dreamweaver.

Technical and Observational Experience

Observing: **Actively involved in preparing the VLA radio observations** for the LITTLE THINGS sample, a total of 376 hours of observation.

Experience with designing observe files in a challenging technical set up, prompted by the the VLA is undergoing an upgrade, replacing the old front end back ends of the antennas with new ones. This has had a high impact on observing because although the line signal was not affected, all continuum sources were, including our calibrators; removing the continuum required extra care and it also caused noise to be aliased into the band. Having the aliasing issue in mind and being forced to observe without on-line Doppler tracking because of unexpected phase jumps between the old VLA antennas and the new EVLA antennas, preparing the observations proved to be a challenge. To ensure good quality of the observations we observed at a fixed frequency, with no Hanning smoothing, using bright calibrators and refraining from changing frequency within the same source observation, so as to avoid phase jumps.

Technical and Observational Experience

Data reduction: Able to handle large amounts of data: I have reduced 25% of the LITTLE THINGS data.

Compiled a data reduction recipe for data obtained during the VLA-EVLA transition. I have had a leading role in designing a new recipe for reducing the data resulting from the VLA-EVLA transition period and making possible its combination with the archival data. I have put time and effort into testing and understanding the aliasing effect so as to nullify its contribution to our final products. In the end, we decided to disregard the EVLA-EVLA baselines, which were beyond rescue and handled the consequent loss in sensitivity by observing longer. To account for the difference in bandpass between the EVLA and VLA antennas I made the bandpass correction at the very beginning and only then followed the rest of the steps of a standard calibration. At each step of the calibration I made checks to make sure the proper calibration is achieved. I have pushed AIPS to extremes, and with the collaboration of team members and AIPS support people we managed to beat the odds and calibrate the data and then combine different array configurations into a master data set.

I have played an important **assisting role also in explaining and troubleshooting different steps of the data reduction process** within the LITTLE THINGS team, for the less experienced interferometrical data users of our team.

Interferometrical data imaging: Testing and experimenting with the Multi-Scale image deconvolution technique as implemented in the Aips task IMAGR. A standard IMAGR map is composed of two maps one which restores the clean components and the other which contains the residuals. Usually the fluxes are determined for the combined map using the clean beam only, whereas in reality the fluxes are a hybrid, represented in part by the cleaned and in part by the original (dirty) beam (Jörsäter & van Moorsel 1995), causing overestimates of the existing flux of up to 50%. To deal with this problem I got involved into testing and fine tuning for our purposes a new cleaning algorithm, the AIPS implementation of Multi Scale CLEAN.

Other Data Related Experience: My technical expertise, of which the most relevant is mentioned above has spread over a number of very different tasks that involved programs such as JObserve for writing observe files, AIPS for data calibration and data reduction, Karma for data analysis and visualization and IDL for creating routines to handle the star formation data analysis. The research grants I have been part of here in Romania offered me the opportunity to handle different kind of data than the radio data I specialized in during my PhD, enriching my expertise on data handling.

Research Duality: Yes, my subjects of research are astrophysics and astronomy education. I strongly believe that by encouraging a healthy dialogue between research and education and by involving researchers in education we can improve education and fine tune it to be better suited for the jobs of the XXI Century. While education helps research by preparing the next generation of researchers, research can help education to be up to date with the newest discoveries, to be accurate, relevant and efficient, even practical. To induce such dialogues we need the “border people”, the people who can mediate between the two realms astronomy and astronomy education and I believe I am one of those.

Educational Sciences knowledge: During the masters program Curricular Management I developed competences in the management/coordination of committees and working groups at the school level and at the county board of education level, also competences in education research, with regard to the education - job market relation, as well as competences in training/mentoring and leadership. I have acquired the skills necessary to design and evaluate educational instruments such as courses, resources and to adapt and personalize the curriculum to best suit the student needs.

Here are some of my **Proposed astronomy related educational programs:**

1. **Communicating complex astronomy content through story tales:**
“The enchanted mantle and its starry little pockets”
2. **Astronomy scientific drawing as a tool for socio-emotional self management.**
3. ***Touch a star: An astronomy lesson for a group of students that includes visually impaired students.***
4. ***Butterfly Effect: The Universe as an interconnected world*** - design of an optional course for VIIth graders that teaches globalization with an astronomy flavor.
5. **Exploratory internship into astronomy research as a career** - 10 weeks project type activity addressed to the XI grade high school students contemplating choosing astronomy as a career.
6. **Starlight: helping parents to help their children** - using astronomy as a family bonding activity and as an interdisciplinary approach to clarify science content taught in school.
7. **5 Days 5+ Sciences and Astronomy** a pilot project that offers an interdisciplinary week with astronomy as a integrating core. The students explore the border between astronomy and other sciences such as biology, chemistry, physics, computer science and engineering starting from five interdisciplinary and transdisciplinary themes such as the ***birth of the universe, life on planet earth, effects of gravitation, technology transfer and measuring the intangible.*** We aim to develop the interdisciplinary mode of thinking in students, to inspire them into studying a new science (for them) astronomy and to make students acknowledge the applications different sciences have in their interconnections. This education program represents the core of my master thesis in astronomy education research.

Teaching and Public Outreach

Teaching:

Experience with holding planetarium sessions for the general public at Bayfordbury Observatory, UK

Supervision of student practicals at Bayfordbury Observatory, UK.

Experience with designing lessons and activities to allow the introduction of astronomy back into the romanian curriculum.

Public outreach:

Writing science outreach articles for the Romanian magazine: "Stiinta si tehnica" ("Science and technology")

Experience holding talks during the public outreach program of the Astronomical Observatory Cluj-Napoca dedicated to children attending the "A different kind of School" event (2013).

Experience with designing astronomy educational programmes. (2017-2020)

ADDITIONAL INFORMATION

Awards and Recognitions

- 1996 Third prize at the National Olympics for Chemistry
- 1997 Special prize at the District Olympics for Mathematics
- 2001 Romanian-Chinese bilateral scholarship for complete studies in astronomy at the University of Nanjing, China
- 2006 Ten weeks summer internship at ASTRON/JIVE, Netherlands
- 2007 Three years University of Hertfordshire PhD studentship, Hatfield, U.K
- 2011 One year graduate internship at NRAO, Socorro, New Mexico, USA

Conferences and Meetings

- 12-14 July 2006** - Conference "The Fate of Gas in Galaxies", ASTRON, Dwingeloo, Netherlands
- 3-5 May 2007** International School for young researchers, Sinaia, Romania
Poster: Is IC51 a polar ring galaxy?
- 8-12 April 2008** Exploring the Solar System and the Universe, Bucharest, Romania
Poster: LITTLE THINGS: A quest to understand dwarfs
- 10-17 June 2008** NRAO Eleventh Synthesis Imaging Workshop, Socorro, USA
- 29 Sept -4 Oct 2008** LITTLE THINGS Workshop, team meeting, Socorro, USA
- 19-24 April 2009** European Week of Astronomy and Space Science, Hatfield, UK,
Poster: Two LITTLE THINGS Dwarf Galaxies Revealed: DDO133 and DDO168

Conferences and Meetings

26-29 March 2010 LITTLE THINGS Workshop, team meeting, Heidelberg, Germany

26-29 March 2011 LITTLE THINGS Workshop, team meeting, Socorro, New Mexico

8-12 January 2012 - 219TH MEETING OF THE AMERICAN ASTRONOMICAL SOCIETY, Austin, Texas, USA, where I gave a talk on “**Star Formation Laws in LITTLE THINGS Dwarfs: The Case of DDO133 and DDO168**” in the AAS Special Session Sesiunea “The LITTLE THINGS Survey”.

19-22 June 2012 Conference “ Star Formation in Dwarf galaxies “, Flagstaff, Arizona, SUA

23-25 June 2012 LITTLE THINGS Workshop, LITTLE THINGS collaboration team meeting, Flagstaff, Arizona, SUA

29-30 May 2014 Symposia **CHALLENGES IN ASTRONOMY, ASTROPHYSICS AND SPACE SCIENCE**, part of the **Academical Days of Cluj** event, Cluj-Napoca, România

21 May 2015 Symposia **INTERNATIONAL YEAR OF LIGHT 2015 - ASTRONOMICAL PERSPECTIVES**, part of the **Academical Days of Cluj** event, Cluj-Napoca, România

29-30 May 2017 Symposia **CONNECTIONS IN ASTRONOMY, ASTROPHYSICS, SPACE AND PLANETARY SCIENCES**, part of the **Academical Days of Cluj** event, Cluj-Napoca, România

7-19 May 2018 Symposia **OUTLOOK IN ASTRONOMY, ASTRO-PHYSICS, SPACE AND PLANETARY SCIENCES**, part of the **Academical Days of Cluj** event, Cluj-Napoca, România

16-18 September 2019 Conference **ASTROEDU Astronomy Education Conference: Bridging Research & Parctice**, Garching b. Munich, Germany

Publications

Astronomy Research

1. ***Study of the Massive X-ray binary LSI+65010***
Vicas, D., Yan, J.Z., Liu, Q. Z.
Rom. Astron. J., Vol. 16, Nr. 2 (2006)

2. ***Is IC51 a polar ring galaxy?***
Vicas, D., Subhashis, R., Anderson, J.
Rom. Astron. J., Vol. 17, Supplement (2007)

3. ***LITTLE THINGS***,
Hunter, D. A., Ficut-Vicas, D., Ashley, T., Brinks, E., Cigan, P., Elmegreen, B. G., Heesen, V., Herrman, K. A., Johnson, M., Oh, S. H., Rupen, M. P., Schrubba, A., Simpson, C. E., Wlater, F., Westpfahl, D. J., Young, L., Zhang, H. X.
Astronomical Journal., Vol. 144, No. 134 (2012)

4. ***High-resolution mass models of dwarf galaxies from LITTLE THINGS***,
Oh, S. H., Hunter, D. A., Brinks, E., Elmegreen, B. G., Schrubba, A., Walter, F., Rupen, M. P., Young, L. M., Simpson, C. E., Johnson, M., Herrmann, K. A., Ficut-Vicas, D., Cigan P., Heesen, V., Ashley, T., Zhang, H. X.
Astronomical Journal., Vol. 149, No. 180 (2015)

5. ***ERRATUM: “LITTLE THINGS”***,
Hunter, D. A., Ficut-Vicas, D., Ashley, T., Brinks, E., Cigan, P., Elmegreen, B. G., Heesen, V., Herrman, K. A., Johnson, M., Oh, S. H., Rupen, M. P., Schrubba, A., Simpson, C. E., Wlater, F., Westpfahl, D. J., Young, L., Zhang, H. X.
Astronomical Journal., Vol. 144, No. 134 (2017)

6. ***Touching on the Relation between Neutral Gas, Stars and Star Formation at 400 pc scales in LITTLE THINGS Dwarf Galaxies***,
Ficut-Vicas Dana, Brinks Elias, Hunter Deidre, Elmegreen Bruce, Rupen Michael, Simpson Caroline, Walter Fabian, Oh Se-Heon, Zhang Hong-Xin, Leroy Adam, and the LT Team (soon to be submitted)

Publications

Astronomy Education Research (AER)

1. ***The Role of Astronomy in Romanian Education***
Ficut-Vicas Dana,
Romanian Review of Geographical Education, Vol. VII, No. 2 (2018),
[DOI:10.23741/RRGE120183](https://doi.org/10.23741/RRGE120183)
2. ***Astronomy a solution for the interdisciplinary and transdisciplinary approach in Romanian educational programs,***
Ficut-Vicas Dana,
(conference proceedings, accepted)
3. ***Communicating complex astronomy content through story tales,***
Ficut-Vicas Dana,
(to be submitted)

Professional Associations

- 2015 Member of the **Romanian National Committee for Astronomy (CNRA)**
- 2017 Member of the **International Astronomical Union (IAU)**
- 2018 Member of the **International Astronomical Union (IAU), Education commission C1.**
- 2020 Member of the **European Cooperation in Science and Technology (COST) Association.**