

# Curriculum Vitae & List of Publications

Mattia Vaccari

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## Summary

I am a research manager and a research scientist with a background in physics, astronomy, computer science, space science and technology. As eResearch Director and Astroinformatics Research Professor, I manage both an eResearch support team and a research group.

I serve as Facility Director for the Ilifu cloud computing facility for astronomy and bioinformatics data intensive research, created with a capital investment of 10 MEUR.

I served as Project Scientist for a 2.5 MEUR EU FP7-SPACE project (HELP) involving 50+ international scientists (from Italy, UK, USA, South Africa etc) to further collaborative research and development in space science and data reduction and analysis. I developed observing procedures, data reduction software and training tools for the 1-billion EUR Herschel space satellite mission, thus contributing to a more effective exploitation of its limited lifetime.

I have obtained competitive research funding as Principal Investigator in national and international calls, including bilateral and multi-lateral collaborative calls, for more than 1.3 MEUR.

I have published 210 papers to date, including 180 refereed papers that have generated 21,000 citations and 42 of which have received 100 citations each or more. My h index (via NASA/ADS) is 68. I have given more than 100 talks at international conferences (excluding collaboration meetings), including more than 20 invited talks.

I have been involved in international scientific consortia for two decades, coordinating working groups of both a scientific and technical nature, organizing and managing meetings and teams, carrying out a variety of management tasks and extensively engaging in student and postdoc supervision as well as in public engagement. I am attracted to challenges and projects requiring a wide range of expertise, and I can effectively lead multi-disciplinary teams.

## Vita, Education & Employment

I was born in Montebelluna, Italy, on 23 January 1975. I am an Italian Citizen and a South African Permanent Resident.

I received a Diploma of Scientific Studies from the "Primo Levi" Scientific High School of Montebelluna (July 1993, 60/60), an MSc in Physics from the University of Padova (17 July 2000, 110/110 *cum laude*) and a PhD in Space Science and Technology from the University of Padova (21 May 2004).

From September 2022 to date I have been employed as eResearch Director within the DVC Office for Research & Internationalisation at the University of Cape Town (UCT), where I am also an Honorary Professor within the Department of Astronomy and carry out Astroinformatics research at the Inter-University Institute for Data Intensive Astronomy (IDIA) where I lead the HIPPO project.

I was granted a B2 rating by the South African National Research Foundation for 2022-2027.

From April 2019 to August 2022 I have been employed as eResearch Director and Astroinformatics Research Professor within the DVC Office for Research & Innovation at the University of the Western Cape (UWC). In this role, I led UWC's eResearch Office and Data Intensive Research Initiative, served as the Ilifu cloud computing facility director. From April 2019 to December 2021 I have been employed as an Associate Professor, and in January 2022 I was promoted to Full Professor.

From October 2017 to March 2019 I have been employed as a Data Fusion and Machine Learning Senior Research Scientist at the Inter-University Institute for Data Intensive Astronomy (IDIA) and based within the Astrophysics Group at the University of the Western Cape in Cape Town.

From 2015 to date I have also been affiliated with the (Bologna) Institute for Radio Astronomy (IRA) of the (Italian) National Institute for Astrophysics (INAF), in recognition of my contribution to Italy - South Africa collaboration activities on SKA science and technology.

From November 2011 to September 2017 I have been employed as a Senior Research Fellow within the Astrophysics Group at the University of the Western Cape in Cape Town, funded by SARA0 and the HELP.

From September 2005 to October 2011 I have been employed as a Herschel/SPIRE Research Fellow and Instrument Scientist within the Department of Physics and Astronomy at the University of Padova.

From November 2003 to August 2005 I have been employed as a Herschel/SPIRE Research Fellow and Instrument Scientist within the Astrophysics Group at Imperial College London.

## Research & Work Experience

My research activity has mostly been concerned with multi-wavelength observational studies of long-wavelength extragalactic populations detected by (far-)infrared, (sub-)millimeter and radio surveys, using number counts, luminosity functions and spectral energy distributions to probe galaxy formation and evolution through cosmic time. Early in my career, I have been involved in several projects involving data reduction and analysis at infrared (loosely defined as 1-1000 micron) wavelengths as well as science planning and simulations for space missions operating at these wavelengths. I have also worked on several space-based instrumentation and related software development projects, both in their planning and proper development phases. More recently, I have led observational projects at both optical and radio wavelengths but also developed a "data fusion" framework to make the most of future extragalactic surveys in a multi-wavelength context. Most of my work has been carried out within a number of large survey projects undertaken by international consortia, where I have developed a strong interest in techniques for the automated reduction and statistical analysis of large datasets on one hand and in software development and science planning for new instrumentation on the other.

More specifically, during my MSc studies at the University of Padova I have worked on simulations of galaxy observations with ESA's Gaia satellite, in order to exploit Gaia all-sky survey capabilities to perform galaxy formation and evolution and large-scale structure studies in the Local Universe. This included the careful simulation of different instrumental effects and the implementation of various image reconstruction techniques and was carried out in close collaboration with the Gaia Science Team, particularly with my supervisors in Copenhagen (where I spent 10 months working on this project), Dr Erik Høg, and in Padova, Professor Pierluigi Bernacca. This study has brought to the inclusion of galaxy observations into the baseline Gaia science plan and has also allowed me to join the Photometry and Imaging Working Group established by ESA for the Gaia mission.

During my PhD studies at the University of Padova (November 2000 to October 2003), which I carried out under the supervision of Professor Alberto Franceschini, I have worked on two lines of research within the realm of space extragalactic long-wavelength astronomy. The former involved the development of tools for ISOCAM and ISOPHOT data reduction and analysis, now jointly known as LARI Method, involving new techniques for cosmic ray impact detection, mathematical modeling of detectors' behavior and mapping/projection. The method is particularly suited for the reliable detection of faint sources in ISO noisy raster maps, and was first tested and employed in the data reduction of ELAIS, the largest open-time project undertaken by ISO, producing the largest extragalactic catalog based on ISO data and providing substantial improvements with respect to other methods as far as reliability, completeness, astrometric and photometric accuracy are concerned. The extreme reliability of the catalog has in time allowed a wide variety of projects involving multi-wavelength identification and follow-up observations, including the largest Spitzer GO1 observing program, aimed at IRS observations of 15 micron-selected high-redshift starbursts and AGNs. Within the latter line of research I carried out numerical simulations of the performance to be expected from future space infrared instrumentation, and applied them to Webb's MIRI and to Herschel's PACS and SPIRE imagers contributing to the science planning of extragalactic large-area surveys to be carried out with such instrumentation.

Following the completion of my PhD I moved to Imperial College London (November 2003 to September 2005) as a Research Fellow working with Professor Michael Rowan-Robinson and Dr David Clements. In London I have continued my work on multi-wavelength identification and follow-up studies of ISO sources while getting involved with the ideal successor of the ELAIS ISO project, i.e. the SWIRE survey. The largest (850 hr) portion of the Spitzer Legacy Science Program, SWIRE observed a total of 50 square degrees in all Spitzer photometric channels within six fields where extensive multi-wavelength coverage is available, producing a catalog of about 2 million infrared galaxies. In this context, I have been collaborating to the catalog validation and leading the characterization of the survey selection function, which has allowed the whole team to work on number counts, luminosity functions and clustering studies on statistically well-defined samples of sources selected at various wavelengths and thus make full use of the photometric redshift information that is available for a substantial fraction of detected sources. In particular, I have led the production of catalogs and the determination of source counts from SWIRE 70 and 160 micron data, which provided the largest extragalactic catalog at these wavelengths from any single Spitzer project. While in London, however, a substantial part of my time was spent on observation planning, software development and ground testing/calibration for the SPIRE camera that has flown on board ESA's Herschel satellite. As a major partner in the SPIRE consortium, Imperial College London has contributed to a vast array of key preparatory activities such as: the software development effort on the SPIRE-specific data reduction pipeline, where I was a lead developer; the users feedback process on the Herschel-wide (i.e cross-instrument) Data Processing system, which saw me as SPIRE representative within the Herschel Data Processing Users Group established by ESA; the definition of SPIRE observing modes and their implementation in the Herschel observing proposal handling tool (HSPOT) developed by ESA, where I co-led the SPIRE Observation Planning Team with responsibility for photometric mapping observations; instrument ground testing, where I contributed through the integration of the instrument simulator with the data reduction pipeline, the specification of the actual tests and the analysis of test data; the planning of the SPIRE GT Data Releases, where I worked on the integration of SPIRE and Herschel data products within the architecture of the Virtual Observatory. In this context, I have been representing SPIRE in a number of Herschel-wide bodies established by ESA. This work has gained me access to the teams that are planning guaranteed- and open-time Key Programs with PACS and SPIRE, including HerMES and H-ATLAS, the largest Herschel guaranteed-and open-time Key Programs, respectively. Partly as a useful complement to my SWIRE involvement and partly to pave the way to my Herschel work I have also worked on some of the most ambitious ground-based extragalactic SMM survey projects. I have extensively observed with SCUBA at JCMT for SHADES and worked on the identification, photometric redshift determination and SED template fitting of SHADES sources by means of infrared and optical data.

Having gone back to Padova (October 2005 to October 2011) as a Research Fellow working with Professor Alberto Franceschini, I have continued my work on Spitzer Cold surveys and carried out early work on Spitzer Warm and Herschel surveys. On the Spitzer Cold side, my work on SWIRE data as well as on archival data provided by COSMOS and GOODS focused on the properties of galaxies detected at MIPS wavelengths and assembling a large spectro-photometric database aimed at their photometric redshift determination and physical characterization. In so doing, I have developed, refined and automated powerful in-house algorithms for maximum-likelihood source identification across multi-wavelength catalogs, photometric redshift estimates

and the calculation of luminosity functions and two-point correlation functions, which have been employed in a number of science projects in collaboration with colleagues and students, leading to three MSc projects and three PhD projects under my supervision. This has also laid the foundations for the Spitzer Data Fusion, the largest Spitzer-selected multi-wavelength extragalactic catalog available to date, covering 65 square degrees within the SWIRE, Bootes and XFLS fields, selected at IRAC wavelengths but systematically incorporating the latest public data from the FUV (GALEX) to the FIR (MIPS), including SDSS, CFHTLS, INTWFS, WFI, VST, UKIDSS, VISTA, allowing to perform synthetic aperture matching of the photometry and thus enabling improved photometric redshift, star formation rate and stellar mass estimates. Thanks to the tools and the data products produced as part of the Spitzer Data Fusion effort, I have played a leading role in planning and exploiting the observations from the Spitzer Warm and Herschel missions, and in particular the Spitzer Extragalactic Representative Volume Survey (SERVS) and Herschel Multi-Tiered Extragalactic Survey (HerMES) projects, employing 1400 and 900 hours of Spitzer Warm and Herschel time respectively. This confirmed the Spitzer Data Fusion as a powerful platform for the exploitation of new surveys, such as UKIRT, VST and VISTA public surveys, the VOICE VST GT survey and radio surveys with the SKA pathfinders and precursors. The more recent incarnations of the Spitzer Data Fusion have since allowed us to consistently compute accurate photometric redshifts, stellar masses and star formation rates for both NIR, FIR and radio-selected samples, reconcile estimates of stellar masses and star formation rates for sources at  $1 < z < 5$  and thus construct a self-consistent picture of stellar mass build-up across most of Cosmic Time.

From 2007 onwards I have been involved in a number of studies for the science planning of future FIR and (S)MM instrumentation and related survey projects. Using our state-of-the-art models for the numbers and properties of long-wavelength extragalactic populations developed to reproduce available observations by ISO, Spitzer and SCUBA, I have carried out extensive simulations of the number counts, redshift distributions and luminosity functions as they would be obtained by Herschel, Planck, SCUBA2, LMT as well as by the current concepts for SPICA, FIRI, Millimetron, the Antarctic SMM Observatory (ASO) under study for deployment at the French-Italian Concordia (Dome C) Antarctic station and the Spectroscopic Active Galaxies and Cluster Explorer (SAGACE) satellite recently approved for a Phase-A study by ASI. In particular, I was part of the team in charge of ESA's Cosmic Vision 2008-2009 Phase-A study for the SAFARI (SPICA Far-Infrared Instrument) instrument to be flown on the SPICA (Space Infrared telescope for Cosmology and Astrophysics) JAXA satellite, I have actively participated into the ARENA (Antarctic Research European Network for Astrophysics) network funded by the European Commission to study the opportunity for a large astronomical facility to be operated in Antarctica, and I was part of the Euclid Science Team's successful bid to ESA to develop the Euclid space mission. I have managed a number of ESA/ASI contracts awarded to his group to develop some of the above projects, and in particular the Padova contribution to the PACS and SPIRE ICCs, supervising their progress and reporting to ESA/ASI.

From 2010 onwards I have been leading the 200-hr 5-yr VST GT VOICE Survey, which exploits the exquisite image and site quality provided by VST and Paranal to provide deep ugr optical data crucial to estimate photometric redshifts, dust attenuation, star formation rates and stellar masses for millions of sources over  $4+4 \text{ deg}^2$  of the CDFS and ES1 fields. The combination of VST-VOICE data with observations by VISTA/VIDEO, Spitzer/SERVS-SWIRE,

Herschel/HerMES and ATCA/ATLAS will provide the most detailed multi-wavelength picture of galaxy formation and evolution processes over 4 deg<sup>2</sup>-size areas, probing larger cosmic volumes and a wider range of environments than CANDELS, GOODS, UDS and COSMOS. The assembly of stellar mass over the crucial  $1 < z < 5$  redshift range, as well as the evolution of the Star Formation Rate Function and of the Black Hole Accretion Rate Function, will be studied as a function of redshift and environment. Observational results will be compared against the predictions from state-of-the-art theoretical models, shedding light on where current models should be improved upon to suitably describe star formation and black hole accretion processes. Survey observations were carried out between 2011 and 2016 and combined a cadenced supernova search and AGN variability survey with a deep multi-band imaging survey, paving the way to DES, LSST and other future time-domain astronomy projects.

From November 2011 to September 2017 I have been employed as a Senior Research Fellow at the University of the Western Cape in Cape Town, where I have been working with Professor Matt Jarvis and Professor Russ Taylor on multi-wavelength galaxy formation and evolution studies and planning for ASKAP/MeerKAT/SKA extragalactic surveys. My main science goal is to improve existing constraints on the evolution of Infrared and Radio source populations, of the Cosmic Star Formation Rate Function and of the Far-Infrared/Radio Correlation at  $0 < z < 5$ , combining deep and wide multi-wavelength datasets for source identification and characterization through SED fitting, using a combination of phenomenological templates and physical SED models for the estimate of photometric redshifts and physical properties respectively. My main contribution to the planning of the ASKAP, LOFAR and MeerKAT extragalactic surveys in the context of other SKA pathfinders and on the way to the SKA lies in providing matched multi-wavelength ancillary data required to better detect and characterize sources detected in radio line and continuum surveys such as ASKAP's EMU, LOFAR's Key Survey Project and MeerKAT's LADUMA and MIGHTEE. In particular, I am part of the MIGHTEE executive where I lead the multi-wavelength data and cross-identification Working Group and as a member of the SKA Continuum Surveys Working Group I am involved in the definition of the SKA Key Science Projects. I also led the South African participation within a 3-year (2015-2017) project to encourage collaboration between Italy and South Africa in radio astronomy and within the 4-year (2015-2018) "BigSkyEarth" EU COST action to leverage Big Data techniques in Astrophysics and Earth Observations. SALT observing programs I am involved with include preparatory spectroscopy for LADUMA and MIGHTEE sources as well as 3-year legacy spectroscopic follow-up project of Herschel-selected strong gravitational lenses. I have also participated to the development of a science case for a wide-field multi-object spectrograph facility to be developed and based in South Africa. In this context, since 2014 I have been working on the Herschel Extragalactic Legacy Project - HELP - an EC-funded project (2014-2018) building upon the Data Fusion to bring together and homogenize most multi-wavelength data obtained within Herschel extragalactic survey fields and provide the astronomical community with a lasting legacy from the past decade of ground and space-based extragalactic surveys. Within HELP, I served as Project Scientist and led the UWC node as well as the Data Fusion Work Package.

From October 2017 to March 2019 I have been employed as a Research Scientist at the University of the Western Cape where I was part of the Inter-University Institute for Data Intensive Astronomy (IDIA). Within IDIA, I have been involved in the development of the

original science case and funding proposal and I led work on Data Fusion and Machine Learning for Multi-Wavelength Galaxy Evolution Studies and the HELP/IDIA Panchromatic Project - HIPPO - whose main aim is to create a cloud-based environment enabling the timely science exploitation of MeerKAT extragalactic surveys. In this role, I have led the development of a Source Characterization software container deploying data fusion tools and machine learning techniques in the cloud which is routinely being used for the scientific exploitation of the MIGHTEE and MeerKLASS MeerKAT Key Survey Projects as well as of MeerKAT Open Time Projects. As part of these preparatory activities, I have worked on the analysis of MeerKAT-like data, namely the deepest GMRT 610 MHz wide-area surveys currently at our disposal, whose resolution matches MeerKAT resolution at 1.4 GHz, to develop a science exploitation pipeline and identify interesting candidates for follow-up studies, and I have applied an early version of this pipeline to deep WSRT and JVLA surveys in collaboration with colleagues in Italy, UK and South Africa. Following the selection techniques recently applied to TGSS/NVSS radio maps to identify the first  $z > 6$  radio galaxy, I now lead a multi-semester SALT project to follow-up high-redshift radio galaxy candidates. I also lead the South African participation within a second (much-better-funded) 3-year (2018-2020, later extended to 2022 due to COVID-19) project to encourage collaboration on SKA Science and Technology between Italy and South Africa.

From April 2019 I am employed as eResearch Director and Astroinformatics Associate Research Professor within the office of the DVC Research & Innovation (R&I) at the University of the Western Cape, where I manage a small eResearch support team (3 staff members) and a small research group (2 postdocs and 5 graduate students). I serve as the Ilifu cloud computing facility director, lead the newly established UWC Data Intensive Research Initiative and carry out research in Astroinformatics and Extragalactic Astronomy within the Inter-University Institute for Data Intensive Astronomy (IDIA) and UWC Astrophysics Group. More specifically, as eResearch Director I am responsible for developing and implementing UWC's eResearch Strategy as part of UWC's Digital Transformation Strategy and UWC's Institutional Operating Plan 2021-2025. This includes developing the infrastructure, user support structure and a program of training activities in the areas of Data Intensive Research and Research Data Management for researchers and postgraduate students as well as coordinating Data Science teaching activities across the university. I also represent the DVC R&I's line in the ICT Portfolio Steering Committee and ICT Governance Committee meetings, and in the Digital Transformation Task Team. As ilifu Facility Director I manage the development and the exploitation of the Ilifu Cloud Computing infrastructure, created with a capital investment of 5 MEUR, implement policies for the 'fair share' use of the facility across the consortium of 6 (university and research organization) partners and promote the ilifu cloud computing model as the basis for a future South African Data Intensive Research Cloud. Finally, as HIPPO Project Leader I manage a research group working on the scientific exploitation of MeerKAT/MIGHTEE, uGMRT/SuperMIGHTEE, ASKAP/EMU, JVLA/VLASS and LOFAR/LoTSS surveys, and in particular exploiting these radio surveys to study the Cosmic Star Formation History and the Far-Infrared Radio Correlation as a function of redshift and environment. I lead the ADFS-MeerKAT project to obtain MeerKAT/MeerLICHT multi-epoch simultaneous observations to probe the faint radio transient sky in the context of multi-wavelength observations, and I collaborate with Computer Scientists at UWC, UCT and Stellenbosch University to apply machine learning techniques to problems such as source classification and physical parameter estimation.

## Teaching Experience

While at Imperial College (2003-2005), I did teach general physics courses in the class or in the lab for 4 hours per week. This has mostly involved teaching first-to-third year physics students subjects such as introductory quantum mechanics, solid state physics, computing and spectroscopy lab. In this context I learnt quite a lot about teaching, grading and tutoring students in their first years, when they may be considering a research career in either academia or industry or otherwise, and helping them along the way discussing and suggesting research or work placements which would allow them to fully explore their career options in an increasingly knowledge-based global economy.

While at the University of Padova (2005-2011), I did give galaxy formation and evolution lectures to BSc (first-to-third year) and MSc (fourth-to-fifth year) students, but I was very much involved in supervising MSc and PhD students working on both extragalactic science based on Spitzer and Herschel data and on software development for Herschel data reduction and analysis. This has allowed me to gain substantial experience in the later phases of students' personal development, as they work toward their BSc, MSc or PhD projects, laying more solid foundations for their career as researchers but also taking decisions that will strongly influence their life in later years.

At the University of the Western Cape (2011-date), from 2012 to 2016 I have been teaching the "Galaxy Formation and Evolution" section of the 3-rd year "Astronomy" course, which included lectures, tutorials and computing lab sessions. From 2017 to date I have been giving guest lectures within the "Data Science for Astronomy" offered by the University of Cape Town as part of its MSc in Data Science. I have also been developing several research projects and supervising BSc/Hons, MSc and PhD students in astronomy within the National Astrophysics and Space Science Program as well as the South African Radio Astronomical Observatory Bursary Program.

In summary, while I have have been employed as a Research Fellow/Scientist/Professor and have thus never held a position with teaching duties, I have not only developed the skills and the experience required to teach effectively in class and/or lab but also a good grasp of the issues affecting a lecturer's overall impact on students' learning experience and future careers, which has been very helpful in my more extensive supervision/management work.



# Supervision

- I have supervised the following students in the area of Observational and Interpretative Galaxy Evolution Studies, Astroinformatics and Astrostatistics, Software Development for Astronomical Data Reduction and Analysis, Image and Signal Processing:

- BSc (1)

1. Filippo Oppizzi (BSc, July 2010, University of Padova)

- BSc Hons (7)

1. Wathela Alhassan (Hons, Dec 2016, NASSP/UCT)
2. Nkateko Baloyi (Hons, Dec 2017, NASSP/UCT)
3. Chaka Mofokeng (Hons, Dec 2017, NASSP/UCT)
4. Kyle Leon Jordaan (Hons, Dec 2019, UWC)
5. Mogammad Yaaseen Jones (Hons, Dec 2020, NASSP/UCT)
6. Walter Silima (Hons, Dec 2020, NASSP/UCT)
7. Ezra Fielding (Hons, Dec 2021, UWC)

- MSc (11)

1. Lucia Dalla Valle (MSc, Mar 2007, Padova)
2. Lucia Marchetti (MSc, Oct 2008, Padova)
3. Giacomo Tarsi (MSc, Jul 2009, Padova)
4. Emmanuel Ocran (MSc, Dec 2015, UWC)
5. Wathela Alhassan (MSc, Dec 2019, UCT)
6. Chaka Mofokeng (MSc, Expected Dec 2022, NASSP/UWC)
7. Sibusiso Mdhluhi (MSc, Expected Dec 2022, UWC)
8. Eslam Hussein (MSc, Apr 2022, UWC)
9. Boikhutso Mabala (MSc, Expected Dec 2022, NASSP/UWC)
10. Mfundo Mdwadube (MSc, Expected Dec 2022, NASSP/UWC)
11. Walter Silima (MSc, Expected Dec 2022, NASSP/UWC)

- PhD (5)

1. Gabriele Mainetti (PhD, Mar 2011, Padova)
2. Svetlana Starikova (PhD, Apr 2011, Padova)
3. Lucia Marchetti (PhD, Oct 2012, Padova)
4. Emmanuel Ocran (PhD, Dec 2020, UCT)
5. Fabio Luchsinger (PhD, Expected Dec 2024, UWC)

- I have also supervised the following postdoctoral fellows (2)

1. Matt Prescott (2017-date, IDIA/UWC)
2. Fang Xia An (2019-date, IDIA/UWC)

and managed the following staff members (3)

1. Oko Lwana (2019-date, ERO/UWC)
2. Frederic Isingizwe (2020-date, ERO/UWC)
3. Sarah Schafer (2020-date, ERO/UWC)

## Outreach

- I am the founding coordinator of the Network of Italian Researchers in the Cape (NIRC), which since 2015 has been bringing together more than 50 Italian researchers working in the Cape and providing a platform for discussion about collaboration on research and development with the Italian government and industry. I have created and managed NIRC's online presence and its ResearchNight.it quarterly public talks reaching audiences of 100-150 people. Since 2016 I have also been invited to represent Italian researchers working in South Africa at the Italian Ministry of Foreign Affairs and International Cooperation's yearly meetings in Rome.
- I have coordinated the content and the production of videos for UWC online channels aimed at prospective students and featuring UWC Astronomy researchers and students.
- I have coordinated the production of press releases and I have given interviews about my research on the press and on the radio.
- I have given popular astronomy talks in schools, science clubs, observatories and planetaria and I have written about popular astronomy for online and printed media.
- I have participated to UWC Astronomy's High School Outreach and Night Sky Viewings.
- I am the Lead Scientific Consultant and NRF Lead for the Hemelligaam Project recording South African History of Astronomy (2017-2022).

## Organization of Meetings

- SKA Pathfinders Radio Continuum Surveys Consortium 2015 Meeting LOC & SOC Member, Kruger Park, South Africa, July 2015
- "A Cosmic Census of the Galaxies in the Distant Universe", Lorentz Centre Workshop SOC Member, Leiden, The Netherlands, June 2016
- AstroInformatics 2017 Conference LOC & SOC Member, Cape Town, South Africa, November 2017
- JEDI Workshop on "Big Data Science" LOC Member & SOC Chair, Nosy Be, Madagascar, May 2018
- "Artificial Intelligence for Data-Driven Astronomy" Workshop SOC Chair, Pretoria, South Africa, June 2018
- Italy-SA SKA-Driven Bilateral Collaboration Workshop SOC Member, Pretoria, South Africa, 24-25 October 2018
- "Multi-Wavelength Astronomy in the Cloud" Workshop OC Chair, SAAO, Cape Town, 26 August 2019
- ilifu User Engagement Workshop OC Chair, UWC, Cape Town, 28 August 2019

- ISARP RADIOSKY2020 Italy - South Africa Research Program Virtual Workshop, 18 June 2020
- European Astronomical Society 2021 Special Session #5 - "Data Intensive Radio Astronomy", SOC Member, Virtual, June 2021
- Astronomical Data Analysis and Software Systems 2021, Cape Town, South Africa, LOC member, October 2021
- SKA Pathfinders Radio Continuum Surveys Consortium 2021 Meeting, SOC Member, Virtual, November 2021
- European Astronomical Society 2022 Special Session #11 - "Towards the SKA Observatory: Artificial Intelligence in radio astronomy", SOC Member, Valencia, June 2022
- SKA Pathfinders Radio Continuum Surveys Consortium 2022 Meeting, LOC & SOC Member, Cape Town, November 2022

## Grants

I have obtained competitive research funding as Principal Investigator in national and international calls, including bilateral and multi-lateral collaborative calls, for over 1.3 Million Euros.

- EU Erasmus Studentship to visit Copenhagen University (1998 - 1999, 5 kEuros)
- University of Padova PhD 3-year Studentship (2000-2003, **50 kEuros**)
- Gini Foundation Travel Grant to visit Imperial College London (2007, 5 kEuros)
- Lincei Academy Travel Grant to visit the University of Sussex (2010, 6 kEuros)
- SARA Senior Research Fellowship (2011-2016, **150 kEuros**)
- South African NRF Travel Grant to visit the University of Naples (2011, 3 kEuros)
- South African NRF Travel Grant to visit the University of Padova (2012, 2 kEuros)
- South African NRF Travel Grant to visit the University of Padova (2013, 3 kEuros)
- EC REA FP7 SPACE HELP Research and Travel Grant (2014-2018, **100 kEuros**)
- South African NRF Travel Grant to visit the University of Naples (2014, 3 kEuros)
- South African NRF Travel Grant to visit ASI Space Data Center (2014, 3 kEuros)
- SA DST/UWC FP7 SPACE HELP Research Grant (2014-2018, **100 kEuros**)
- Italy - South Africa SKA Bilateral Collaboration Grant (2015-2017, **60 kEuros**)
- South African NRF History of Astronomy Roadmap Grant (2017-2022, **60 kEuros**)
- IDIA Postdoctoral Research Fellowship Grant (2017-2020, **80 kEuros**)

- Italy - South Africa SKA Bilateral Collaboration Grant (2018-2020, **400 kEuros**)
- UWC Data Intensive Research Initiative (2019-2023, **200 kEuros**)
- South African NRF Competitive Individual Support (2020-2022, **50 kEuros**)
- UWC Coordinator for UWC/UniBo Erasmus+ Exchange (2020-2022, **30 kEuros**)

## Computing

- I have substantial experience installing, using and administering a wide variety of Unix-like operating systems and a working knowledge of Microsoft Windows operating systems. All other things being equal, however, Apple's MacOS has long been my operating system of choice for personal devices while using Ubuntu Linux for Virtual Machines and/or Cloud Computing deployment.
- I am a proficient user of Microsoft Office (Word, Excel, PowerPoint), Apple iWork (Pages, Numbers, Keynote) and LibreOffice productivity tools.
- I have extensive experience in scientific programming, data analysis and GUI development using IDL, Python and Unix shell scripting.
- I have extensive experience with Astropy, AstrOmatic and CASUTools astronomical software tools as well as in their integration in data reduction and analysis, instrument commissioning and data quality control pipelines..
- I have moderate experience using R, Java, Matlab, Mathematica, x/g-gobi, iraf, supermongo, Fortran, C, C++, Perl, sed/awk and mysql/postgresql.
- I am an expert user of command-line and graphical tools for astronomical catalog and image visualization and manipulation such as Aladin, SAOImage/DS9, Gaia/SkyCat and Stilts/Topcat and in their integration with Virtual Observatory resources for archival research.
- I have substantial experience in HTML, PHP and CGI scripting applied to the production of static and dynamic web pages and moderate experience in web design, maintenance and administration running Apache, php/mysql, phpBB, TWiki, WordPress and Drupal.
- Within the ISO/ELAIS project I have contributed substantially to the production of a GUI-based software package (The LARI Package) for the interactive reduction of ISO-CAM/PHOT data exploiting a physical model of the detectors' behavior.
- Within the SWIRE and HerMES consortia I have led the production of a versatile set of software tools simulating Spitzer and Herschel maps and instrumental features. These tools were extensively used in designing the SWIRE and HerMES surveys and in producing simulations aimed at characterizing the survey selection function at IRAC/MIPS and PACS/SPIRE wavelengths.
- Within the SWIRE, HerMES and SERVS/DeepDrill consortia I have been leading the development of an IRAC wide-area source detection and multi-wavelength cross-identification pipeline. This effort has in time evolved into the Spitzer Data Fusion project, which I have led since its inception and whose main aim is the production of an IRAC-selected multi-wavelength catalog and its exploitation toward studies of the cosmic star formation and black hole accretion history.
- Within the Herschel/SPIRE project I have contributed to the full development cycle of the Herschel Observation Planning Tool (HSPOT) and of the Herschel Interactive Processing Environment (HIPE), from the compilation of detailed user requirements to

the realization of GUIs, the implementation of map-making algorithms and finally the evaluation of users' feedback as a member of a number of bodies established by ESA and the SPIRE consortium.

- Within the IDIA/ilifu collaboration, I coordinate a number of committees in charge of the ilifu facility and coordinate the research community's inputs to the ilifu operations team and to the IDIA/ilifu executive. More specifically, I lead the "Research and Technical" Committee of the ilifu facility and the gathering of user requirements in terms of astronomical software, user experience and user training.

## Collaborations

Collaborative activities I lead are indicated in bold.

- Gaia Photometry and Imaging Working Groups (2000 - 2002)
- ELAIS (ISO Open Time Program) Science Team (2001 - 2005)
- SWIRE (Spitzer Legacy Program) Science Team (2003 - date)
- SPIRE Science Team (2003 - date)
- SPIRE High-Redshift Galaxies Science Team (HerMES GT KP) (2003 - date)
- SPIRE Low-Redshift Galaxies Science Team (DGS/HRS/VNGS GT KPs) (2003 - date)
- SPIRE ICC Observation Planning & Software Development Teams (2003 - 2011)
- Herschel Data Processing Users Group (2003 - 2005 & 2007 - 2011)
- SHADES Consortium (2004 - 2011)
- JCMT Legacy Survey Consortium (2005 - 2011)
- H-ATLAS (Herschel OT KP) Science Team - (2008 - date)
- SERVS/DeepDrill (Spitzer Exploratory Science Program) Consortium (2008 - date)
- **Spitzer Data Fusion Collaboration Lead (2009 - date)**
- SAFARI/SPICA Consortium & Science Team (2008 - date)
- EMU (ASKAP Survey Program) Consortium (2009 - date)
- SPARCS (SKA Pathfinders Radio Continuum Surveys Consortium) (2009 - date)
- LADUMA & MIGHTEE (MeerKAT Survey Program) Consortia (2010 - date)
- WODAN (WSRT APERTIF Survey Program) Consortium (2010 - date)
- VIDEO (ESO VISTA Public Survey Program) Consortium (2010 - date)
- **VOICE (ESO VST GT Survey Program) Consortium Co-PI (2010 - date)**
- Euclid Consortium & Science Team (2010 - 2012)
- COSMOS (Cosmic Evolution Survey) Consortium (2011 - date)
- LOFAR Survey Key Science Project Consortium (2011 - date)
- **EU FP7 SPACE HELP Project Scientist UWC & SA Lead (2013 - date)**
- **Italy - South Africa SKA Bilateral Collaboration South African PI (2015-2017)**
- SKA Continuum Surveys Working Group Member (2014-date)

- VLASS (VLA Sky Survey) Science Team (2014 - date)
- **EU COST BigSkyEarth Action South African PI (2014-2018)**
- Inter-University Institute for Data Intensive Astronomy (IDIA) Co-I (2015-date)
- FIRSPEX and FLARE (ESA M5 Proposed Missions) Consortia (2015 - date)
- VEILS and SHARKS (ESO VISTA Public Survey Programs) Consortia (2015 - date)
- SALT Gravitational Lensing Project Consortium (2015 - date)
- **IDIA Data Fusion & Machine Learning Project Scientist (2017 - date)**
- **HIPPO (HELP-IDIA Panchromatic Project) PI (2017 - date)**
- **SPARCS (SKA Pathfinders Radio Continuum Surveys Consortium) Multi-Wavelength Data Fusion & Cross-Identification Working Group Lead (2017 - date)**
- **Italy - South Africa SKA Bilateral Collaboration South African PI (2018-2021)**
- **Ilifu Cloud Computing Facility Director (2019 - date)**
- 4MOST ORCHIDSS/WAVES Survey (2020 - date)
- South African NITheCS (National Institute for Theoretical and Computational Sciences) Associate (2021 - date)



## References

The following can be contacted upon request:

- Dave Clements, Reader (Associate Professor), Imperial College London, UK
- Alberto Franceschini, Professor, Department of Physics & Astronomy, University of Padova, Italy
- Seb Oliver, Professor & Deputy Pro-Vice-Chancellor (Research), University of Sussex, UK
- Isabella Prandoni, Associate Astronomer (Associate Professor), Institute for Radio Astronomy, National Institute for Astrophysics, Bologna, Italy
- Russ Taylor, Research Chair (Professor) & Director of the Inter-University Institute for Data Intensive Astronomy (IDIA), University of Cape Town, South Africa & University of the Western Cape, South Africa

## Talks

I have given about 100 talks about my research at international conferences (excluding collaboration meetings), including 20 invited talks (indicated in bold).

**17 May 2001** - "Gaia : a European Space Project" Summer School, 14-18 May 2001, Ecole de Physique des Houches, Les Houches, France, "Gaia Galaxy Survey: a Multi-Color Galaxy Survey with Gaia", **Invited Talk**

25 September 2001 - "Probing the Origin of the Extragalactic Background Radiation" EU TMR Network Meeting, 25-26 September 2001, Imperial College, London, UK, "ELAIS 15  $\mu\text{m}$  Northern Fields: A Status Report on Data Reduction with the LARI Method"

6 February 2002 - Padova Workshop on Galaxy Formation and Evolution, 6-7 February 2002, Department of Astronomy, University of Padova, Padova, Italy, "ISO Extragalactic Surveys: Data Reduction with the LARI Method"

27 June 2002 - Exploiting the ISO Data Archive: Infrared Astronomy in the Internet Age, 24-27 June, 2002, Sigüenza, Spain, "Final Analysis of ELAIS 15  $\mu\text{m}$  Northern Fields: Data Reduction with the LARI Method"

27 August 2002 - Asiago Rendez-Vous 2002: Nuove prospettive per l'Astronomia Italiana dalla Terra e dallo Spazio, 26-27 August 2002, Asiago Astrophysical Observatory, Asiago, Italy, "The ELAIS Fields: Final Results from ISO and Future Prospects"

4 September 2002 - ROE Workshop 2002, "The Invisible Universe - Survey Astronomy at Wavelengths beyond 1 Micron", 4-5 September 2002, ROE, Edinburgh, UK, "The ELAIS Fields: Final Results from ISO and Future Prospects"

**17 December 2002** - PACS Extragalactic Programs Italian Meeting, SISSA/ISAS, Trieste, Italy, "Extragalactic Surveys with Herschel", **Invited Talk**

16 April 2003 - 47<sup>th</sup> SAIIt (Società Astronomica Italiana - Italian Astronomical Society) Congress, "Nuovi Orizzonti dell'Astrofisica Italiana", 14-17 April 2003, Trieste, Italy, "The ELAIS Fields: Final Results from ISO and Future Prospects"

18 June 2003 - Multi-Wavelength Cosmology Conference, 17-20 June 2003, Mykonos, Greece, "Final Analysis of ELAIS 15  $\mu\text{m}$  Fields"

11 Aug 2004 - SWIRE Science Team Meeting, 9-13 August 2004, Imperial College, London, UK, "SWIRE Data Reduction : Catalogue Validation & Selection Function Characterization Through Simulations"

30 September 2004 - SPIRE Consortium Meeting, 28-30 September 2004, RAL, UK, "SPIRE Interactive Analysis Software : Presentation and Demonstration"

11 May 2005 - SPIRE Photometer Simulator Workshop, 11 May 2005, RAL/CCLRC, Chilton,

UK, "SPIRE Data Processing"

**21 July 2005** - SPIRE Consortium Meeting, 19-21 July 2005, CalTech, Pasadena, California, USA, "SPIRE Data Products", **Invited Talk**

**31 January 2007** - Herschel Open Time Extragalactic Key Program Workshop, 31 January 2007, Padova, Italy, "Observing Extragalactic Surveys with SPIRE", **Invited Talk**

**28 Mar 2007** - "The Origin of Galaxies : Exploring Galaxy Evolution with the New Generation of Infrared-Millimetre Facilities", Universitätszentrum, Obergurgl, Austria, "The FIR & Sub-mm View on Galaxies: from Spitzer & SCUBA to Herschel & SCUBA2", **Invited Talk**

21 April 2007 - 51<sup>st</sup> SAIIt (Società Astronomica Italiana - Italian Astronomical Society) Congress, Firenze, Italy, "The FIR & Sub-mm View on Galaxies: from Spitzer & SCUBA to Herschel & SCUBA2"

14 May 2007 - Weekly Seminar, UBC, Vancouver, Canada, "The FIR & Sub-mm View on Galaxies: from Spitzer & SCUBA to Herschel & SCUBA2"

**19 June 2007** - "The Astrophysical Science Cases at Dome C" 2nd ARENA Conference, Potsdam, Berlin, Germany, "Sub-mm/FIR Galaxy Evolution Studies at Dome C", **Invited Talk**

**26 June 2007** - "Submm/FIR Astronomy from Antarctica : Toward a Large Single-Dish Telescope at Dome C?" ARENA Workshop, CEA, France, "Sub-mm/FIR Galaxy Evolution Studies at Dome C", **Invited Talk**

24 July 2007 - Italian Antarctic Astronomy Meeting, INAF, Monte Mario, Roma, Italy, "Sub-mm/FIR Galaxy Evolution Studies at Dome C"

**1-9 August 2007** - "The Large Millimeter Telescope : First-Light Science and Future Surveys", Guillermo Haro Workshop 2007, INAOE, Mexico, "Studying the Obscured Cosmic Star Formation History of the Universe with Spitzer and Herschel" **Invited Talk**

21 Nov 2007 - Weekly Seminar, NRAO, Socorro, New Mexico, USA, "Studying the Obscured Cosmic Star Formation History of the Universe with Spitzer and Herschel"

16 Jan 2008 - Padova Astronomical Observatory Weekly AstroPizza, Padova, Italy, "FIR & sub-mm Astronomy comes of age : Herschel Space Observatory Observing Opportunities"

18-19 February 2008 - EARA Workshop, "The Herschel Promises for Galaxy Evolution Studies", IAP, Paris, France, "Studying the Obscured Cosmic Star Formation History of the Universe with Spitzer and Herschel"

6-7 March 2008 - SAGACE Workshop, Department of Physics, La Sapienza University, Roma, Italy, "A sub-mm & mm Spectroscopic View on Herschel & SCUBA2 Starburst Galaxies :

Planning for SAGACE Follow-Up Studies”

2-6 June 2008 - SPIRE ICC Meeting, NHSC, IPAC, CalTech, Pasadena, USA, ”SPIRE Visualization Tools”

1-3 December 2008 - EURO-VO ”Multi-Wavelength Astronomy & Virtual Observatory” Workshop, ESAC/ESA, Madrid, Spain, ”Local Benchmarks of IR Galaxy Evolution : The SWIRE-SDSS Far-Infrared Local Luminosity Function & VO Tools”.

23 January 2009 - HerMES Meeting, CalTech, Pasadena, USA, ”HerMES Herschel Observations”

13 May 2009 - ARENA3 Conference ”An astronomical Observatory at Dome C (Antarctica) for the next decade”, Villa Tuscolana, Frascati, Italy, ”Resolving the FIR/SMM Background from Concordia Station”

15 June 2009 - HerMES Meeting, RAL, UK, ”HerMES Herschel Observations”

3 July 2009 - VIIth Marseille International Cosmology Conference ”Harvesting the Desert : The Universe Between Redshift 1 and 3”, Marseille, France, ”The Herschel Multi-tiered Extragalactic Survey (HerMES) - Measuring the Infrared Galaxy Formation History of the Universe”

5 October 2009 - HerMES Meeting, Imperial College, London, UK, ”HerMES Multi-Wavelength Data Fusion”

1 December 2009 - HerMES Meeting, University of Sussex, Brighton, UK, ”HerMES Multi-Wavelength Data Fusion”

15 June 2010 - HerMES Meeting, University of Padova, Italy, ”HerMES Multi-Wavelength Data Fusion”

**25 October 2010** - ”The Herschel Space Observatory : Rationale, Mission and Challenges”, National School of Astrophysics, 25-29 October 2010, Asiago Astrophysical Observatory, Asiago, Italy, **Invited Talk**

7 December 2010 - HerMES SCAT/XID Meeting, University of Sussex, Brighton, UK, ”HerMES Data Fusion Wide and Deep”

18 January 2011 - HerMES Consortium Meeting, UBC, Vancouver, Canada, ”Multi-Wavelength Data Fusion Deep & Wide for HerMES DR1 Science”

14 March 2011 - SERVS Consortium Meeting, IAP, Paris, France, ”IRAC12 Band-Merging & Multi-Wavelength Data Fusion for SERVS Science”

1 September 2011 - ”Feeding the Giants : ELTs in the era of Surveys” ESO Workshop, Ischia, Italy, ”HerMES : The Herschel Multi-Tiered Extragalactic Survey”

11 November 2011 - SKA-SA 2011 Postgraduate Bursary Conference, Stellenbosch, South Africa, "From Spitzer to Herschel Extragalactic Surveys : The Evolution of the Infrared Luminosity Function and of the Cosmic Star Formation Rate Density"

22 December 2011 - Weekly Seminar, USM/LMU, Munich, Germany, "From Spitzer to Herschel Extragalactic Surveys : The Evolution of the Infrared Luminosity Function and of the Cosmic Star Formation Rate Density"

23 Jan 2012 - LADUMA Consortium Meeting, UCT, Cape Town, South Africa, "LADUMA Ancillary Data"

16 February 2012 - "Astrophysics from the radio to the sub-millimetre : Planck and other experiments in temperature and polarization", Bologna, Italy, "From Spitzer to Herschel Extragalactic Surveys : The Evolution of the Infrared Luminosity Function and of the Cosmic Star Formation Rate Density"

19 June 2012 - "First National Meeting on Science and Technology with SKA : The Italian Pathway to SKA", Roma, Italy, "South(ern) African Astronomy on its way toward the SKA"

25 June 2012 - Weekly Seminar, INAF-IRA, Bologna, Italy, "South(ern) African Astronomy on its way toward the SKA"

18 Oct 2012 - "Science from the Next Generation Imaging and Spectroscopic Surveys" ESO Workshop, Garching, Munich, Germany, "The VST GT SUDARE/VOICE Project: Galaxy Evolution, AGN Variability and Supernova Host Galaxies with VST"

**5 Nov 2012** - SALT/MeerKAT Workshop, MeerKAT Office, Cape Town, South Africa, "MIGHTEE Ancillary Data Needs/Plans", **Invited Talk**

29 November 2012 - SKA-SA 2012 Postgraduate Bursary Conference, Stellenbosch, South Africa, "The SUDARE/VOICE Survey : The Deaths of Stars and The Lives of Galaxies"

21 June 2013 - MIGHTEE Consortium Meeting, UCT, Cape Town, South Africa, "MIGHTEE Ancillary Data Needs/Plans"

18 September 2013 - "Synergistic Science with Euclid and the Square Kilometre Array", University of Oxford, UK, "The Obscured Cosmic Star Formation History : From Spitzer/Herschel's Era to Euclid/SKA's"

29 November 2013 - SKA-SA 2013 Postgraduate Bursary Conference, Stellenbosch, South Africa, "The Obscured Cosmic Star Formation History : From Herschel to the SKA"

04 June 2014 - SKA Pathfinders Radio Continuum Surveys 2014 Meeting, Catania, Italy, "The Obscured Cosmic Star Formation History and the Cross-Identification Challenge : From Her-

schel to the SKA (Pathfinders)”

28 November 2014 - ”The Universe of Digital Sky Surveys” Conference, Naples, Italy, ”HELP-ing Digital Sky Surveys : The Herschel Extragalactic Legacy Project”

3 December 2014 - CHPC Conference 2014, Kruger Park, South Africa, ”Big Data and The Coming of Age of Multi-Wavelength Astrophysics”

**27 Jan 2015** - IBM/IDIA Big Data and Exascale Technology Workshop, 27 Jan 2015, UCT, Cape Town, ”Big Data and The Coming of Age of Multi-Wavelength Astrophysics”, **Invited Talk**

10 March 2015 - UK-SA Royal Society Workshop on ”The Role of AGN in Galaxy Evolution”, Oxford, UK, ”The Spitzer Data Fusion and the SERVS/DEEPDRILL Project”

31 March 2015 - ”Netherlands / South Africa Radio Continuum Surveys Workshop”, UCT, Cape Town, South Africa, ”HELP-ing Radio Continuum Surveys : The Herschel Extragalactic Legacy Project”

2 June 2015 - SALT Science Conference 2015, Stellenbosch, South Africa ”HELP-ing Deep & Wide Sky Surveys : The Herschel Extragalactic Legacy Project”

2 July 2015 - SKA Pathfinders Radio Continuum Surveys 2015 Meeting, Kruger Park, South Africa, ”HELP-ing Radio Continuum Surveys : The Herschel Extragalactic Legacy Project”

8 October 2015 - Astrominformatics 2015 Conference, Dubrovnik, Croatia, ”HELP-ing Multi-Wavelength Sky Surveys : The Herschel Extragalactic Legacy Project”

21 October 2015 - ”The Many Facets of Extragalactic Radio Surveys : Towards New Scientific Challenges” Conference, Bologna, Italy, ”HELP-ing Radio Continuum Surveys : The Herschel Extragalactic Legacy Project”

20 November 2015 - ”Making Sense of MIGHTEE/EMU : Radio Source Identification & Characterization”, MIGHTEE/EMU Workshop, UCT, Cape Town, South Africa

3 February 2016 - ”PHISCC 2016: Upgrading Our HI Toolkit” Conference, Cape Town, South Africa, ”HELP-ing HI Surveys : The Herschel Extragalactic Legacy Project”

2 March 2016 - UK-SA Royal Society Workshop on ”The Role of AGN in Galaxy Evolution”, Muizenberg, Cape Town, South Africa, ”HELP-ing Galaxy Evolution Surveys : The Herschel Extragalactic Legacy Project”

**12 April 2016** - IDIA Data Science Workshop, 12 Apr 2016, UWC, Cape Town, ”Data Fusion & Data Mining @ IDIA : The Coming of Age of Multi-Wavelength Astrophysics”, **Invited Talk**

12 April 2016 - National Astronomy & Space Science Program Colloquium, UCT, Cape Town,

”The Universe in Full Color : Multi-Wavelength Studies of the Cosmic Star Formation History”

26 August 2016 - High-Energy Astrophysics in Southern Africa 2016 Conference, SAAO, Cape Town, South Africa, ”HELP-ing High-Energy Surveys : The Herschel Extragalactic Legacy Project”

3 November 2016 - SKA Pathfinders Radio Continuum Surveys 2016 Meeting, Goa, India, ”HELP-ing Radio Continuum Surveys : The Herschel Extragalactic Legacy Project”

22 February 2017 - National Astronomy & Space Science Program Colloquium, UCT, Cape Town, ”The Universe in Full Color : Multi-Wavelength Studies of the Cosmic Star Formation History”

12 April 2017 - India-SA Workshop on uGMRT/MeerKAT Joint Surveys, UCT, Cape Town, ”Data Fusion & Data Mining @ IDIA : The Coming of Age of Multi-Wavelength Astrophysics”, **Invited Talk**

2 March 2018 - National Astronomy & Space Science Program Colloquium, UCT, Cape Town, ”The Universe in Full Color : Multi-Wavelength Studies of the Cosmic Star Formation History”

3 April 2018 - India-SA Workshop on uGMRT/MeerKAT Joint Surveys, NCRA, Pune, India, ”The Universe in Full Color : Data Fusion & Machine Learning Tools for Multi-Wavelength Source Classification”, **Invited Talk**

6 September 2018 - Astroinformatics 2018 Conference, HITS, Heidelberg, ”The IDIA Cloud and the HIPPO Project”

24 October 2018 - Italy-SA Radio Astronomy Workshop, NRF, Pretoria, South Africa, ”Multi-Wavelength Data Fusion & Machine Learning Challenges”, **Invited Talk**

5 November 2018 - SciDataCon 2018, Gaborone, Botswana, ”Skills Development in Data Science at IDIA”

7 November 2018 - SciDataCon 2018, Gaborone, Botswana, ”Machine Learning for Radio Source Characterization”

19 December 2018 - BigSkyEarth Network Conference, IAC, Tenerife, Spain, ”The IDIA Cloud and the HIPPO Project”, **Invited Talk**

5 March 2019 - National Astronomy & Space Science Program Colloquium, UCT, Cape Town, ”The Universe in Full Color : Multi-Wavelength Data Fusion & Machine Learning Tools for Radio Source Characterization”

14 May 2019 - iThemba Labs Colloquium, Cape Town, South Africa, ”The ilifu Cloud Computing Facility & X-Informatics Data Intensive Research”, **Invited Talk**

11 July 2019 - SAAO Colloquium, Cape Town, South Africa, "The ilifu Cloud Computing Facility & the HIPPO Project: Multi-Wavelength Astronomy in the Cloud", **Invited Talk**

20 February 2019 - South African MIGHTEE Early Science Workshop 2019, UWC, Cape Town, South Africa, "IDIA Cloud Environment for MIGHTEE Post-Processing and Analytics"

6 June 2019 - superMIGHTEE Collaboration Workshop, Kruger National Park, South Africa, "Multi-Wavelength Data Fusion & Radio Source Characterization for (super)MIGHTEE"

26 August 2019 - "Multi-Wavelength Astronomy in the Cloud" Workshop, SAAO, Cape Town, "Current & Future Multi-Wavelength Astronomy Projects on the IDIA/ilifu Research Cloud", **Invited Talk**

28 August 2019 - ilifu User Engagement Workshop, UWC, Cape Town, "Current & Future Multi-Wavelength Astronomy Projects on the IDIA/ilifu Research Cloud", **Invited Talk**

7 October 2019 - Astronomical Data Analysis and Software Systems 2019, Groningen, The Netherlands, "Multi-Wavelength Astronomy in the Cloud : the ilifu cloud computing facility and the HIPPO Project"

18 June 2020 - RADIOSKY2020 Italy - South Africa Research Program Virtual Workshop, "Current Status and Future Opportunities for Italy - South Africa Collaboration in SKA Science & Technology", **Invited Talk**

2 October 2020 - 3rd Gran Sasso International Forum 2020, Teramo, Italy, "The Square Kilometre Array: Big Science Projects & Human Capacity Development to future-proof South Africa's Economy & Society", **Invited Talk**

7 June 2021 - NITheCS Colloquium, Virtual, "The ilifu Cloud Computing Facility & X-Informatics Data Intensive Research", **Invited Talk**

28 June 2021 - European Astronomical Society 2021 Special Session #5 on Data Intensive Radio Astronomy, Virtual, Summary Talk, **Invited Talk**

8 October 2021 - The Third National Workshop on the SKA Project - The Italian Route to the SKAO Revolution, "The Ilifu Cloud Computing Facility: Enabling MeerKAT Science"



## Publications

I have co-authored  $\sim 180$  *refereed* papers to date, 40 of which have received more than 100 citations each. The total number of citations generated by my the papers is  $\sim 18,000$  and the corresponding *h* index is 65 (via NASA/ADS). In addition, I have contributed to several ISO, Spitzer and Herschel software manuals and tutorials and to the documentation accompanying the public release of ISO, Spitzer and Herschel catalogs and images as well as of associated multi-wavelength catalogs. I have also served as referee for journals such as the AAS Journals (ApJ and AJ), MNRAS and A&A.

### 2002

**Vaccari M. 2002**, "Gaia Galaxy Survey: A Multi-Colour Galaxy Survey with Gaia", Proceedings of "Gaia: A European Space Project", EAS Publications, 2, 313 <https://ui.adsabs.harvard.edu/abs/2002EAS...2..313V>

### 2003

**Franceschini A. et al. 2003**, "Deep Infrared Surveys and their Cosmological Implications", The Messenger, 113, 56 <https://ui.adsabs.harvard.edu/abs/2003Msngr.113...56F>

**Lari C. et al. 2003**, "The LARI Method for ISO-CAM/PHOT Data Reduction and Analysis", ESA SP-511, 349 <https://ui.adsabs.harvard.edu/abs/2003eida.conf..349L>

**Vaccari M. et al. 2003**, "Final Analysis of ELAIS 15  $\mu\text{m}$  Fields", Supplementi alle Memorie della Società Astronomica Italiana, 3, 173 <https://ui.adsabs.harvard.edu/abs/2003MSAIS...3..173V>

**Vaccari M. et al. 2003**, "The LARI Method for ISO-CAM/PHOT Data Reduction and Analysis", Supplementi alle Memorie della Società Astronomica Italiana, 3, 376 <https://ui.adsabs.harvard.edu/abs/2003MSAIS...3..376V>

### 2004

**Afonso-Luis A. et al. 2004**, "A study of the 15  $\mu\text{m}$  quasars in the ELAIS N1 and N2 fields", MNRAS, 354, 961 <https://ui.adsabs.harvard.edu/abs/2005MNRAS.358..333G>

**Gonzalez-Solares E. et al. 2004**, "Large Scale Structure in the ELAIS S1 Survey", MNRAS, 352, 44 <https://ui.adsabs.harvard.edu/abs/2004MNRAS.352...44G>

**Johansson P.H., Väisänen P. & Vaccari M. 2004**, "A population of extreme mid-to-near-infrared sources: obscured AGN and dusty starbursts", A&A, 427, 795 <https://ui.adsabs.harvard.edu/abs/2004A%26A...427..795J>

**Manners J. et al. 2004**, "Mid-infrared sources in the ELAIS Deep X-ray Survey", MNRAS, 355, 97 <https://ui.adsabs.harvard.edu/abs/2004MNRAS.355...97M>

**Rowan-Robinson M.** et al. **2004**, "The European Large Area ISO Survey (ELAIS): The Final Band-Merged Catalogue", MNRAS, 351, 1290 <https://ui.adsabs.harvard.edu/abs/2004MNRAS.351.1290R>

**Serjeant S.** et al. **2004**, "The European Large Area ISO Survey IX: the 90  $\mu\text{m}$  luminosity function from the Final Analysis sample", MNRAS, 355, 813 <https://ui.adsabs.harvard.edu/abs/2004MNRAS.355..813S>

**Vaccari M.** et al. **2004**, "Final Analysis of ELAIS 15  $\mu\text{m}$  Fields", Proceedings of "Multi-Wavelength Cosmology", Astrophysics and Space Science Library, 301, 177 <https://ui.adsabs.harvard.edu/abs/2004ASSL..301..177V>

## 2005

**Dennefeld M.** et al. **2005**, "FIRBACK IV. Towards the nature of the 170 micron population", A&A, 440, 5 <https://ui.adsabs.harvard.edu/abs/2005A%26A...440....5D>

**Fang F.** et al. **2005**, "Large-Scale Structure in the Spitzer Wide-Area Infrared Extragalactic Survey", AAS Meeting 207, 207, 63.49, BAAS, 37, 1255 <https://ui.adsabs.harvard.edu/abs/2005AAS...207.6349F>

**Franceschini A.** et al. **2005**, "Complete Multiwavelength Characterization of Faint Chandra X-ray Sources Seen in the Spitzer Wide-Area IR Extragalactic (SWIRE) Survey", AJ, 129, 2074 <https://ui.adsabs.harvard.edu/abs/2005AJ....129.2074F>

**Gonzalez-Solares E.** et al. **2005**, "The European Large Area ISO Survey (ELAIS): Optical Identifications of 15  $\mu\text{m}$  and 1.4 GHz sources in N1 and N2", MNRAS, 358, 333 <https://ui.adsabs.harvard.edu/abs/2005MNRAS.358..333G>

**Mortier A.** et al. **2005**, "The SCUBA Half Degree Extragalactic Survey (SHADES) – I. Survey motivation, design and data processing", MNRAS, 363, 563 <https://ui.adsabs.harvard.edu/abs/2005MNRAS.363..563M>

**Rowan-Robinson M.** et al. **2005**, "Spectral energy distributions and luminosities of galaxies and AGN in the SPITZER SWIRE Legacy Survey", MNRAS, 129, 1183 <https://ui.adsabs.harvard.edu/abs/2005AJ....129.1183R>

**Taylor E.** et al. **2005**, "Properties of FIRBACK-ELAIS 175 micron sources in the ELAIS N2 region", MNRAS, 361, 1352 <https://ui.adsabs.harvard.edu/abs/2005MNRAS.361.1352T>

**Vaccari M.** et al. **2005**, "Final Analysis of ELAIS 15  $\mu\text{m}$  Observations", ESO Astrophysics Symposia, 2, 467 <https://ui.adsabs.harvard.edu/abs/2005mmgf.conf..467V>

**Vaccari M.** et al. **2005**, "Final Analysis of ELAIS 15  $\mu\text{m}$  Observations: Method, Reduction and Catalogue", MNRAS, 358, 397 <https://ui.adsabs.harvard.edu/abs/2005MNRAS.358..397V>

## 2006

**Babbedge T., Rowan-Robinson M., Vaccari M. et al. 2006**, "Luminosity functions for galaxies and quasars in the Spitzer Wide-Area Infrared Extra-galactic (SWIRE) Legacy survey", MNRAS, 370, 1159 <https://ui.adsabs.harvard.edu/abs/2006MNRAS.370.1159B>

**Coppin K. et al. 2006**, "The SCUBA Half Degree Extragalactic Survey (SHADES) – II. Submillimetre maps, source catalogues and number counts", MNRAS, 372, 1621 <https://ui.adsabs.harvard.edu/abs/2006MNRAS.372.1621C>

**Franceschini A. et al. 2006**, "Cosmic evolution of the galaxy mass and luminosity functions by morphological type from multi-wavelength data in the CDF-South", A&A, 453, 397 <https://ui.adsabs.harvard.edu/abs/2006A%26A...453..397F>

**Gonzalez-Solares E. et al. 2006**, "Angular correlation of 3.6 and 24 micron galaxies in the SWIRE N1 field", Proceedings of "The Spitzer Space Telescope: New Views of the Cosmos", ASP Conference Series, 357, 248 <https://ui.adsabs.harvard.edu/abs/2006ASPC..357..248G>

## 2007

**Aretxaga, I. et al. 2007**, "The SCUBA Half Degree Extragalactic Survey - IV. Radio-mm-FIR photometric redshifts", MNRAS, 379, 1571 <https://ui.adsabs.harvard.edu/abs/2007MNRAS.379.1571A>

**Iverson, R. et al. 2007**, "The SCUBA Half Degree Extragalactic Survey - III. Identification of radio and mid-infrared counterparts to submillimetre galaxies", MNRAS, 380, 199 <https://ui.adsabs.harvard.edu/abs/2007MNRAS.380..199I>

**Takagi T. et al. 2007**, "The SCUBA Half Degree Extragalactic Survey (SHADES) - V. Submillimetre properties of near-infrared-selected galaxies in the Subaru/XMM-Newton deep field", MNRAS, 381, 1154 <https://ui.adsabs.harvard.edu/abs/2007MNRAS.381.1154T>

**Waddington I. et al. 2007**, "Clustering of galaxies at 3.6  $\mu\text{m}$  in the Spitzer Wide-area Infrared Extragalactic legacy survey", MNRAS, 381, 1437 <https://ui.adsabs.harvard.edu/abs/2007MNRAS.381.1437W>

## 2008

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