

# Giuliana Cosentino

## Chalmers University of Technology

Phone: +39 3791011328

Email: [giuliana.cosentino@chalmers.se](mailto:giuliana.cosentino@chalmers.se)

### PROFILE

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I am a Cosmic Origin Postdoctoral Fellow at Chalmers University interested in understanding the earliest phases in the formation process of high-mass stars. Among my research interests is the characterisation of the physical and chemical processes associated with the dense part of the Interstellar Medium (ISM) through observations of molecular tracers and laboratory experiments. I have been applying my analysis to the study of the formation and evolution of Infrared Dark clouds (IRDCs), with particular interest in cloud-cloud collision processes and magneto-hydrodynamic (MHD) shocks developed by the interaction between IRDCs and supernova remnants. I recently obtained my PhD from University College of London and, during my master and PhD projects, I have been acquiring the capability to collect and analyse massive sets of data from both laboratory experiments and observations. As observer, I am able to collect and analyse data from single-dish radio-telescopes and to handle datasets from interferometric observations (calibration, reduction and imaging of ALMA data). In the field of laboratory experiments, I am able to plan and conduct experiments on my own, to achieve and maintain levels of ultra-High vacuum in experimental chambers and how to collect and analyse spectra obtained by means of IR and Quadrupole Mass (QMS) spectrometers. During my carrier, I learnt how to schedule and organise my own tasks, in the most possible independent way, and how to efficiently collect the most recent knowledges on my own research topic. I also have been acquiring teaching experiences i.e contemporary to my bachelor and master degrees as private Maths, Physics, Chemistry and occasionally Biology tutor. During the years spent at UCL, I have been teaching to 1st year undergraduate students as lab demonstrator. The teaching experiences have taught me how to relate with a non-expert audience and hence encouraged me to present even very complex and specific notions in the simplest way.

### EDUCATION

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**Cosmic Origin Postdoctoral Fellowship at Chalmers University of Technology** Nov 2019-today

<b>Ph.D.</b>	<b>University College of London</b> <b>European Southern Observatory</b>	Nov 2015 - Oct 2019 Sept 2018 - Aug 2019
<b>MPHYS</b>	<b>Università degli Studi di Palermo</b> “Interstellar Ice Analogues. The role of a silicate substrate in the UV irradiation of methanol ices”.	Oct 2013 - Oct 2015 <i>Grade: 110/100 cum laude</i>
<b>Bachelor</b>	<b>Università degli Studi di Palermo</b> “Formation of Complex Organic molecules by X-rays irradiation of CO ices; interest from an astrophysical point of view”.	Oct 2013 - Oct 2015 <i>Grade: 110/100</i>

## SPECIALISED TRAINING

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### **9th IRAM Millimetre Interferometry School (FR)**

October 10<sup>th</sup>-14<sup>th</sup> 2016

The school provided me specialised training on theory of millimetre interferometry and techniques of data calibration and imaging. The school was particularly focused on the use of NOEMA and ALMA. Theoretical sessions were accompanied by hands-on activities on real data sets.

### **Astrochemistry: From Space to the Earth (FR)**

Aug 29<sup>th</sup> - Sept 09<sup>th</sup> 2016

The school covered topics ranging from observational to theoretical and laboratory astronomy, with particular regard to methods of detection and analysis of interstellar molecules; basics astrochemical processes and modelling; interstellar chemistry and star formation; basics of laboratory experiments for astrochemistry and spectroscopy. Hands-on activities provided the opportunity to apply the acquired knowledges to real astronomical outstanding questions.

## GRANTS & AWARDS

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2015-2018	IMPACT PhD Studentship	University College of London
2015-2018	Perren PhD Studenship	University College of London
2018-2019	ESO Studentship Program Europe	European Southern Observatory

## OBSERVING SKILLS

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**Instituto de Radioastronomia Millimetrica (IRAM30m).** I am able to independently prepare and perform observations using the 30m single-dish antenna located in pico Veleta (Spain). Having carried out several observing pools (both related to my projects and on behalf of other scientists) with this facility, I am now considered an expert observed and I am allowed to make use of the facility remotely.

**Arizona Radio Observatory (ARO - SMT).** I carried out observing runs with the 10-m Heinrich Hertz Submillimeter Telescope (SMT) at ARO. Observations were part of the SAMPLING large observing program.

## IT & LANGUAGE SKILLS

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### IT Skills

Programming Skills            PHYTON, IDL

Modelling & Analysis Skills    CASA, GILDAS, SCOUSE, MHD\_VODE

The SCOUSE code is an IDL tool that I used to perform robust and systematic analysis of multiple the line profiles. MHD\_VODE is a fortran code that I used to obtain models of the kinematic structure and molecular abundances of gas processed by MHD shocks.

General Skills                    Latex, Microsoft Word, Excel, PowerPoint, Pages, Numbers, KeyNotes

### Language Skills

Italian            Native speaker

English            Advanced (6.5 IELTS certificate), lived in London from Nov 2015 to August 2018

## PROFESSIONAL SERVICES & ACTIVITIES

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**Laboratory Demonstrator**            Courses PHAS1240, PHAS1241  
University College of London (2016 - 2018)

**Local Organising Committee**        Take a Closer Look  
European Southern Observatory (Oct 2018)

**Co-organiser**                            Star & Planet Formation Seminar Series  
European Southern Observatory (from Dec 2018)

**Scientific Assistants**                    Period 103 Observing Programmes Committee  
European Southern Observatory (Nov 2018)

## TELESCOPE PROPOSALS

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### Accepted and Pending Proposal as Primary Investigator

IRAM30m    Project 005-17

Widespread SiO Emission in IRDCs: Molecular Cloud Filament Forming via Cloud-Cloud Collision

IRAM30m    Project 041-18

Widespread SiO Emission in the Filamentary Infrared Dark Cloud G034.77-00.55

JCMT            Project M18BP053

Mapping Magnetic Field in Infrared dark Clouds

APEX Project 0102.C-0616(B)  
The Infrared dark Cloud G034.77-00.55: chronicle of the first fully resolved CJ-type shock

SMA Project 2018B-S038  
G034.77-00.55 and the first fully resolved CJ-type interstellar shock

ARO Large Observing Program  
SHREC: SHock interactions between supernova REmnants and molecular Clouds

ALMA Project 2019.1.00639.S  
The Infrared-Dark Cloud G034.77-00.55: chronicle of the first fully resolved CJ-type shock

### Accepted and pending Proposal as Co-investigator

ALMA Project 2016.1.01363.S P.I. I. Jimenez-Serra  
Widespread SiO in IRDCs: Cloud-Cloud Collision Formation of Molecular Cloud Filaments?

ALMA Project 2018.1.00850.S P.I. A.T. Barnes  
From Filaments to Cores: Dynamics in Infrared Dark Clouds

NOEMA Project S18AA P.I. J.D. Henshaw  
Investigating the kinematic Imprint of an Interstellar Collision

IRAM30m Project 007-17 P.I. S. Zahorecz  
Measuring the Ionisation reaction across the Galaxy using PGCCs

SOFIA P.I. F. Alves  
Mapping Magnetic Field Orientation in Infrared dark Clouds

### CONFERENCE CONTRIBUTIONS

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#### Invited/Special Talks and Seminars

- **Widespread SiO emission in Infrared Dark Clouds and other shock interactions**  
Wine & Cheese Seminar - August 2019
- **"Widespread SiO Emission in a sample of IRDCs"**  
Star & Planet Formation - ESO - October 2018
- **"Probing Cloud-Cloud Collision with Silicon Monoxide"**  
UCL-UHC Star Formation Meeting - May 2018
- **"Widespread SiO emission in IRDCs ...with a sprinkle of Supernova Remnant"**  
AstroLunch Talk - UCL - February 2018
- **"Widespread SiO and CH<sub>3</sub>OH emission in Filamentary Infrared Dark Clouds"**  
Star Formation and ISM Meeting - RAS - January 2017

#### Contributed Talks

- **"Widespread SiO emission in Infrared Dark Clouds and other shock interactions"**

From Star To Planet Formation II - June 2019

- **“Widespread SiO and CH<sub>3</sub>OH emission in Filamentary Infrared Dark Clouds”**  
Astrochemistry For All - January 2018
- **“Widespread SiO and CH<sub>3</sub>OH emission in IRDCs”**  
Faraday Joint Interest Group Conference - April 2017
- **“SiO and CH<sub>3</sub>OH parsec-scale emission in Infrared Dark Clouds”**  
RSC-RAS Astrophysical Chemistry Meeting - May 2016

## **Posters**

- **“Widespread SiO and CH<sub>3</sub>OH emission in Filamentary Infrared Dark Clouds”**  
Olympian Symposium 2018 - Greece - June 2018
- **“Widespread SiO and CH<sub>3</sub>OH emission in Filamentary Infrared Dark Clouds”**  
Faraday Joint Interest Group Conference - April 2017
- **“SiO and CH<sub>3</sub>OH parsec-scale emission in Infrared Dark Clouds”**  
Star Formation 2016 - Exeter University - August 2016