

Aneesh Baburaj

(he/him/they)

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Research Interests: Exoplanets, Planet formation, High-contrast techniques, High-resolution spectroscopy, Stellar abundances, Protoplanetary disks, Atmospheric composition, Exoplanet demographics, Software Development

EDUCATION

UC San Diego, La Jolla, CA, USA
Ph.D. in Physics (Expected)

July 2022 - Present

UC San Diego, La Jolla, CA, USA
Masters in Physics

September 2019 - June 2022
GPA: 3.85/4

Indian Institute of Science, Bengaluru,
Karnataka, India
Bachelor of Science (Research)
Major : Physics

August 2015 - May 2019
GPA: 7.1/8

SELECTED RESEARCH EXPERIENCE

Department of Astronomy & Astrophysics,
UC San Diego

July 2020 – present

Graduate research (Advisor: Dr. Quinn Konopacky)

- Atmospheric characterization of directly imaged companions and their host stars to constrain planet formation pathways.
- Analysis of high-resolution host star spectra from the Levy spectrograph at Lick (Baburaj et al. 2024), and the GHOST spectrograph at Gemini South.
- Analysis of JWST NIRSpec IFU data for GJ 504b (GTO 2778; PI Perrin) and HD 206893B (GO 5485; PI Baburaj) using high contrast spectroscopy techniques.

Raman Research Institute (RRI), Bengaluru, India &
Indian Institute of Science (IISc)

August 2018 – April 2019

Bachelor's thesis (Primary advisor: Dr. K. S. Dwarakanath, RRI; Co-advisor: Dr. Nirupam Roy, IISc)

Max Planck Institute for Astrophysics, Garching,
Germany

May 2018 – July 2018

Summer Project (Advisor: Dr. Guinevere Kauffmann)

Department of Physics, Indian Institute of Science
Summer Project (Advisor: Dr. Chanda Jog)

May 2017 – July 2017

Department of Molecular Reproduction, Development and
Genetics (MRDG), Indian Institute of Science
Project (Advisor: Dr. Deepak Saini)

May 2016 – October 2016

HONORS & AWARDS

1. **Future Investigators in NASA Earth and Space Science and Technology (FINESST)** *2023–2025*
2. **UC San Diego Physics Chairs Challenge Travel Award** *2025*
3. **Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship** *2015–2019*
4. **National Talent Search (NTS) fellowship** *2013–2015*

OBSERVING PROPOSALS & GRANTS

As Program PI

- JWST Cycle 3 GO 5485** *2024*
“How big can you make a planet? Spectroscopic characterization of HD 206893B”
- XSEDE Renewal allocation PHY230140** *August 2024 – August 2025*
100,000 SUs for project “Constraining Directly Imaged Planet Formation using High-Resolution Spectroscopy of Host Stars”
- XSEDE Startup allocation PHY230140** *August 2023 – August 2024*
100,000 SUs for project “Constraining Directly Imaged Planet Formation using High-Resolution Spectroscopy of Host Stars”
- FINESST Graduate Fellowship** *2023 – 2025*
- Gemini South/GHOST** *2024*
1.47 nights in Semester 2024B
- CTIO/CHIRON** *2022–2023*
4.22 nights from 2022A and 2023A
- Lick Observatory/APF Levy** *2022–2024*
7 nights from 2022A to 2024B

As Program Co-I

- JWST Cycle 2 GO 3522** *2023*
“Spectroscopic characterization of the smallest and coolest directly imaged exoplanet 51 Eridani b” (PI Ruffio)
- CTIO/CHIRON** *2021*
1 night in Semester 2021B (PI Konopacky)
- Lick Observatory/APF Levy** *2021*
1.5 nights from 2021A and 2021B (PI Konopacky)

SELECTED PUBLICATIONS

1. **Baburaj, A.**, Konopacky, Q., Theissen, C., Peacock, S., Huseby, L., Fulton, B., Gerasimov, R., Barman, T., Hoch, K., 2024, “A High-Resolution Spectroscopic Survey of Directly Imaged Companion Hosts: I. Determination of diagnostic stellar abundances for planet formation and composition”, *AJ*, in press, arXiv e-prints, arXiv:2409.14239
2. **Baburaj, A.**, Konopacky, Q., Barman, T., Crossfield, I; Hoch, K., Ruffio, J.-B., Sappéy, B., Theissen, C., 2023, “How big can you make a planet? Spectroscopic characterization of HD 206893B”, *JWST Proposal. Cycle 3, 5485*

SELECTED TALKS

- “*Two Halves of a Whole: Constraining Planet Formation via High-Resolution Spectroscopy of Host Stars and their Companions*” Invited Talk. Northwestern/CIERA Observational Group, Evanston, IL, October 24
- “*Constraining Directly Imaged Planet Formation using High Resolution Spectroscopy of Host Stars*” Talk. STScI Spring Symposium, Baltimore, MD, May 23
- “*High Resolution Spectroscopy of Directly Imaged Planet Hosts*” Invited Talk. STScI Exoplanets and High Contrast Imaging Group, Baltimore, MD, June 22

PROGRAMMING LANGUAGES AND SKILLS

- Proficient: **Python, MATLAB, Linux, HTML**
- Beginner: **IDL, C/C++**
- Wet Lab Skills: **Microbial Culture, Gel Electrophoresis, Polymerase Chain Reaction**

TEACHING, MENTORING, AND OUTREACH EXPERIENCE

Astronomy & Astrophysics Outreach Committee	<i>September 2024 – Present</i>
UCSD Cosmic Tours	<i>September 2024 – Present</i>
Undergraduate Research Mentor	<i>June 2024 – Present</i>
- Ms. Camila Martinez, UC Santa Cruz	
Local Organizing Committee, Cool Stars 22, San Diego, CA	<i>June 2024</i>
Barrio Logan Science & Art EXPO	<i>April 2024</i>
San Diego Festival of Science and Engineering EXPO Day	<i>March 2024</i>
Astronomy on Tap San Diego	<i>February 2024</i>
Teaching assistant (Lower Division Physics)	<i>September 2019 – September 2021</i>

OTHER WORKSHOPS AND CONFERENCES

Cool Stars 22, San Diego, CA	<i>June 24–28, 2024</i>
Extreme Solar Systems V, Christchurch, New Zealand	<i>March 16–21, 2024</i>
Protostars and Planets VII, Kyoto, Japan	<i>April 10–15, 2023</i>
AAS 241, Seattle, WA	<i>January 8–12, 2023</i>
Keck Science Meeting, Pasadena, CA	<i>September 15–16, 2022</i>
Cool Stars 21, Toulouse, France	<i>July 4–9, 2022</i>
Spirit of Lyot 2022, Leiden, Netherlands	<i>June 27–July 1, 2022</i>
Keck Science Meeting, San Diego, CA	<i>September 9–10, 2021</i>
2021 Sagan Exoplanet Summer Virtual Workshop	<i>July 19–23, 2021</i>

REFERENCES

- Dr. Quinn Konopacky (UC San Diego): qkonopacky@ucsd.edu
- Dr. Christopher Theissen (UC San Diego): ctheissen@ucsd.edu
- Dr. Marshall Perrin (Space Telescope Science Institute): mperrin@stsci.edu