Núcleo Interdisciplinario de estudios en contaminación lumínica | CURE Centro Universitario Regional del Este | ESPACIO INTERDISCIPLINARIO | UNIVERSIDAD DE LA REPÚBLICA URUGUAY

A National Milestone in Light Pollution Research: Uruguay's Interdisciplinary Approach to ALAN Mitigation

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URUGUAY
Capital: Montevideo
Population: ~3.5 million inhabitants
Area: 176,000 km²
Population density: ~20 people per km²

Núcleo Interdisciplinario de estudios en contaminación lumínica

The Interdisciplinary Group for Light Pollution Studies was formalized in March 2025 as a 30-month project funded by the Interdisciplinary Space of UdelaR (Uruguay), bringing together researchers from Montevideo, Maldonado, and Rocha, with collaborators in Chile, the United States, and Spain.

Objective

The general objective of the Interdisciplinary Group is to consolidate a team that addresses, from an interdisciplinary and multidimensional perspective, the study of light pollution and its mitigation, aimed at protecting the night sky, ecosystems, and human health in Uruguay.

Research

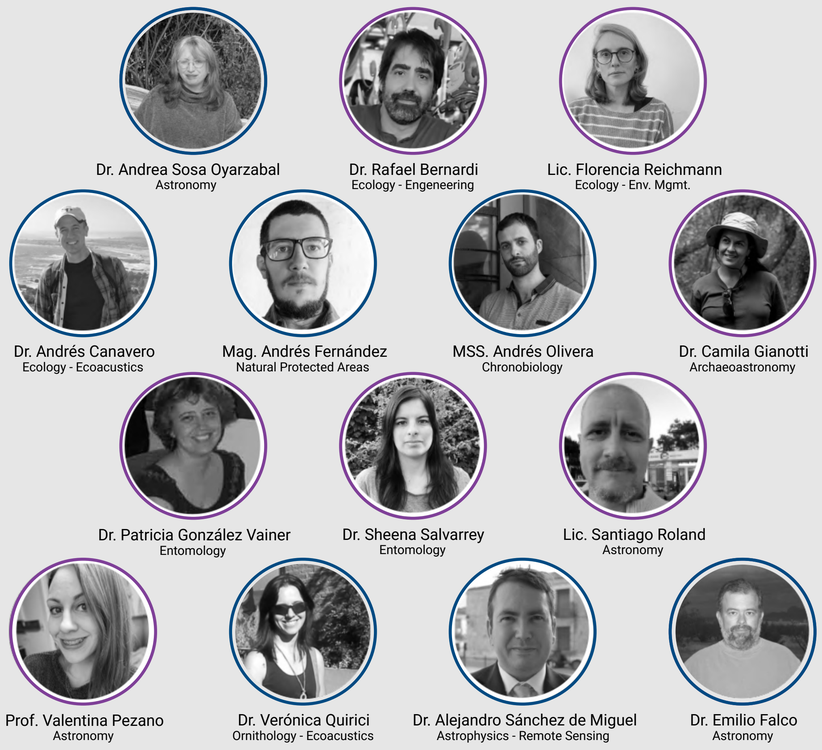
Develop interdisciplinary research on the night sky and light pollution, systematizing knowledge, characterizing sky brightness across Uruguay, and analyzing its ecological, cultural, and social impacts.

Outreach

Generate evidence-based inputs for public policy development and promote social awareness through outreach activities, technical advising, and the production of educational materials on night sky conservation.

Education

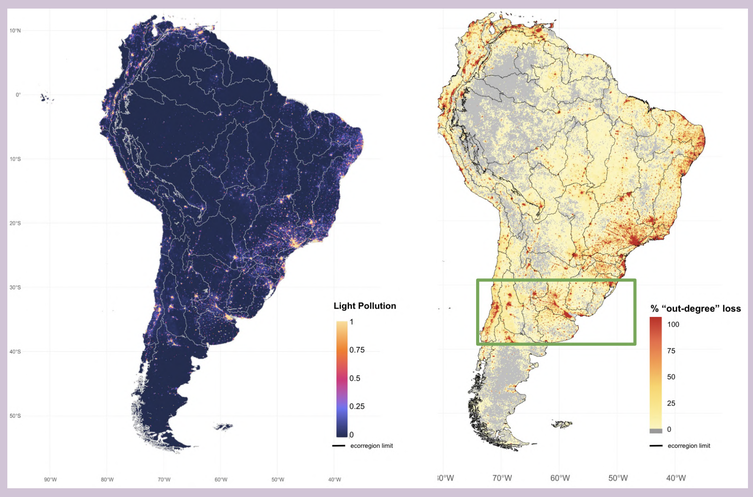
Strengthen and expand educational opportunities on light pollution within Udelar, at undergraduate, graduate, and continuing education levels, as well as through collaborations with international institutions.



Ecological and Night Sky Impact Research

ALAN impact on connectivity patterns across South America

MSc. thesis (submitted)
Theoretical modeling using graph theory to assess the potential impact of artificial light at night (ALAN) on continental-scale connectivity patterns, based on centrality metrics and metapopulation capacity.



Assessment the environmental and biodiversity impact of LED transition in Montevideo

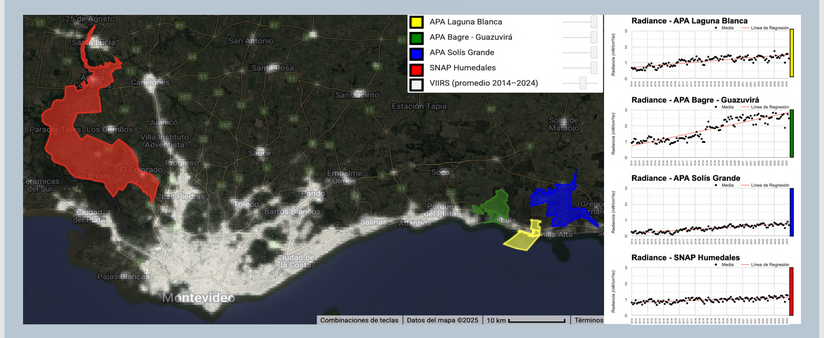
We assess the environmental impact of artificial light at night in Montevideo through a collaboration between academic researchers and the city's Technical Unit of Public Lighting. The work integrates night-sky brightness monitoring, ecoacoustic surveys of birds, and insect sampling to evaluate the shift from sodium to LED lighting. Using standardized field protocols and long-term measurements, we aim to understand how new lighting technologies affect urban biodiversity and night-sky quality, providing scientific input for the city's Lighting Master Plan.


PAM | SQM | Glue Traps

Policy and Institutional Collaboration

ALAN assessment in protected areas of Canelones

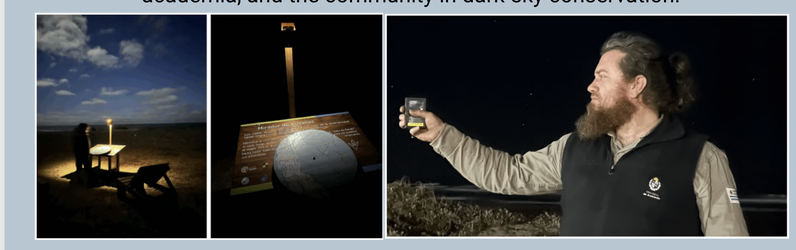
In collaboration with the local government of Canelones, we are addressing the protection of dark skies in environmentally protected areas of the department and advancing towards a regulatory framework for light emissions.



Dark skies protection at Laguna Garzón, Maldonado

In collaboration with the National System of Protected Areas (SNAP), night-sky monitoring program was established. Park rangers provide ground measurements, while the research team analyzes satellite (VIIRS) and long-term SQM data to assess light pollution trends. Laguna Garzón is the only protected area in Uruguay with internal light-mitigation guidelines in its management plan, setting a national precedent for dark-sky conservation.

Park rangers, residents, and institutions co-created signage, a star-viewing platform, and an annual star party—a collaborative effort uniting authorities, academia, and the community in dark-sky conservation.



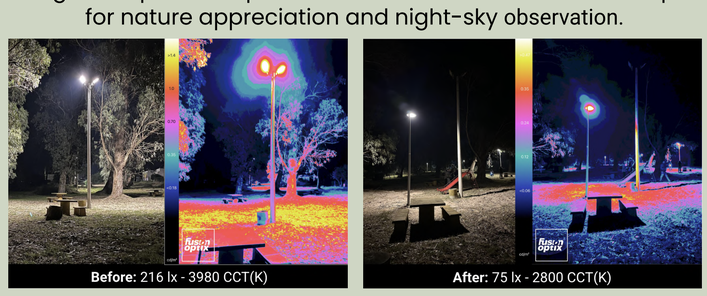
Towards an ALAN Regulation in Rocha

A draft regulatory framework for light emissions was presented and is currently under review by the Departmental Government of Rocha.The proposal, based on territorial planning instruments (IDR Exp. 2024/2900), introduces zoning criteria for dark-sky protection — marking the first step toward a local regulation on artificial light at night (ALAN) in Uruguay.

Community Engagement and Education

"Manzana Verde" for environmental education

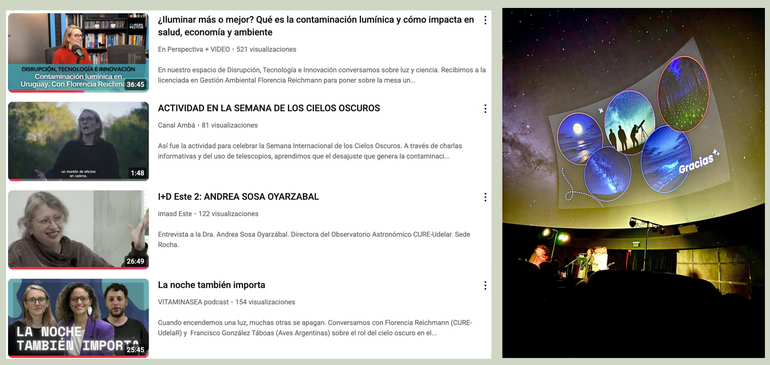
In Santa Lucía del Este (Canelones, Uruguay), the community achieved a transformation of their local public square through a collaborative project supported by the Interdisciplinary Group, the local government, and private partners. Low-impact LED luminaires (2700 K) were installed within the square, creating an environmentally friendly lighting system designed to minimize ecological impact and promote the area as an educational space for nature appreciation and night-sky observation.


Before: 216 lx - 3980 CCT(K)
After: 75 lx - 2800 CCT(K)

International DarkSky Week 2025 and beyond...

From the Interdisciplinary Group for Light Pollution Studies, we organized outreach activities during the IDSW, including the creation of educational materials, talks in schools and community centers, and guided night-sky observations with telescopes.These actions fostered awareness and appreciation of the night sky as a shared ecological and cultural heritage.

Interviews, podcasts and events



Conclusions and Perspectives

This initiative marks a key step in strengthening science-based management of artificial light at night in Uruguay. Building on collaborative work between research institutions, local governments, and communities, we aim to advance towards regulatory frameworks, capacity building, and greater public awareness. The strong response and engagement received reaffirm the importance of this path, and we look forward to deepening learning and exchange with colleagues to enhance our collective performance in protecting the night as a shared ecological and cultural resource.

Learn more and get in touch! nucleoecl.cure.edu.uy - nucleoecl@cure.edu.uy