

PIERO AMODIO

Department of Biology and Evolution of Marine Organisms, Stazione Zoologica Anton Dohrn,
Villa Comunale, 80121 Napoli, Italy

piero.amodio@szn.it

www.szn.it/index.php/en/staff/list-of-personnel/1116-amodio-piero/9695-amodio-piero
<https://explorers.nationalgeographic.org/directory/piero-amodio>

RESEARCH STATEMENT

I study the behaviour of other species, both in the lab and in the field, as a tool to unravel fundamental aspects of the mind and evolution of non-human animals.

ACADEMIC EMPLOYMENT

- March 2022 – **Staff Scientist (Ricercatore III livello)**, Stazione Zoologica Anton Dohrn, Napoli, Italy
- 2020 – 2022 **Postdoc & Leverhulme Trust SAS grantee**, Stazione Zoologica Anton Dohrn, Italy,
 - Assembling a brain-size dataset for Mediterranean cephalopods;
 - Piloting novel paradigms to test octopus' tool use behaviour in the lab.
- 2015 – 2016 **Fixed-Term Contract, Sea Museum**, Fondazione IDIS - Città della Scienza, Napoli, Italy
 - In charge of public engagement tasks (guided tour of the Museum, educational activities for children, design of museum exhibitions);
 - Caretaker for marine species in aquaria.
- 2014 **Research Scholarship, SZN (Italy) & VisualSonics (Netherlands)**
 - Learned to analyse cardio-vascular performance in mice through ultrasound imaging techniques, and explored how to adapt these procedures to the octopus.
- 2012 – 2013 **Research Assistant, Association for Cephalopod Research (CephRes)**, Italy
 - Caretaker of common octopus;
 - Designed and conducted behavioural tests (e.g., social learning, predatory behaviour, problem solving) in the octopus.
- 2012 **Research Trainee at Primate Station, Universität Zurich**, Switzerland with Dr J. Burkart
 - Trained to conduct cognitive tests in captive squirrel monkeys (*Saimiri sciurens*) and to analyse experimental video through Noldus software.
- 2010 **Field Assistant** to Prof Nadav Shashar, Italy
 - Investigated octopus' camouflage abilities in the wild
- 2008 – 2010 **Research Trainee at SZN**, Italy, with Dr Graziano Fiorito
 - Trained to maintain and test cephalopods in captivity

EDUCATION

- 2016 – 2020 **PhD in Psychology, University of Cambridge, UK**, with Prof Nicky Clayton & Dr Ljerka Ostojić
 - Devised a hypothesis for the evolution of intelligence in octopuses and other cephalopods;
 - Tested the cognitive underpinnings of complex behaviours – tool use, future planning, perspective taking – in the Eurasian jay (birds in the crow family).

- 2013 – 2015 **MSc in Anthropology, Universität Zurich, Switzerland**, with Prof Carel van Schaik & Dr Maria van Noordwijk
- Investigated nest building behaviour in wild orangutans, finding that the basic building technique is shared among different individuals but the selection of nesting trees and the extra elements of the nests (e.g., ‘pillow’) may be acquired through social learning.
- 2010-2013 **MSc (Hons) in Animal Behaviour, Università di Firenze, Italy**
- Conducted a pilot experiment on mirror self-recognition in the common octopus, finding that self-reflected images trigger social responses.
- 2005 – 2010 **BSc in Biology, Università di Napoli Federico II, Italy**
- Showed that video-playback stimuli can be employed to investigate predatory and social behaviour the common octopus.

PUBLICATIONS

In preparation – under review – accepted

- Papetti V, Sampaio E & **Amodio P** (*accepted*). Cephalopod cognition: Next generation approaches to tackle fundamental knowledge gaps. In: Ramsey, G & Aaby BH (Eds.). *Psychodiversity: Cognition and Sentience Beyond Humans*. Routledge.
- Amodio P**, Marzec A, Mitra Setia T, van Noordwijk MA & van Shaik CP (*in prep.*). A reverse engineering approach to unveil great apes’ nest building techniques: a proof of concept in Bornean orang-utans (*Pongo pygmaeus wurmbii*)
- Elia V, Balestrieri R, Minichino A, Fioretti A & **Amodio P** (*in prep.*). Remarkable innovative problem-solving abilities in nestling and fledging seagulls (*Larus michaellis*).

Published contributions

19. Salvador* P, **Amodio* P**, Grech D, Sponza S, & Balestrieri R. (2026). Do diving seabirds exploit landscape elements for underwater ambushing?. *Behaviour*, 163(1), 85-94. <https://doi.org/10.1163/1568539X-bja10356>
18. Sampaio E, Schnell* AK & **Amodio* P** (2025). Cognition in multi-species sociality. *Current Biology*, 35(4) R132-R136. doi: 10.1016/j.cub.2025.01.012
17. Rosa R, Santos C P, Borges F, **Amodio P**, Amor M, Bower J R, ... & Gleadall I G (2024). Past, present, and future trends in octopus research. In *Octopus Biology and Ecology* (pp. 421-454). Academic Press.
16. **Amodio P**, & Fiorito G (2022). A preliminary attempt to investigate mirror self-recognition in *Octopus vulgaris*. *Frontiers in Physiology*, 13:951808. doi: 10.3389/fphys.2022.95180812.
15. **Amodio P**, Farrar B, Krupenye C, Ostojić L, & Clayton NS (2021). Little evidence that Eurasian jays protect their caches by responding to cues about a conspecific’s desire and visual perspective. *eLife*, 10: e69647. doi.org/10.7554/eLife.69647
14. **Amodio P**, Josef N, Shashar N, & Fiorito G (2021). Bipedal locomotion in *Octopus vulgaris*: a complementary observation and some preliminary considerations. *Ecology and Evolution*, 11:3679-3684. doi.org/10.1002/ece3.7328
13. **Amodio* P**, Brea* J, Farrar BG, Ostojić L, & Clayton NS (2021). Testing two competing hypotheses for Eurasian jays’ caching for the future. *Scientific Reports*, 11:835. doi.org/10.1038/s41598-020-80515-7
12. **Amodio P**, Shigeno S, & Ostojić L (2020). Evolution of intelligence in cephalopods. *eLS*, 1: 77-84. doi.org/10.1002/9780470015902.a0029004.
11. Schnell AK, **Amodio P**, Boeckle M, & Clayton NS (2021). How intelligent is a cephalopod? Lessons from comparative cognition. *Biological Reviews*, 96: 162-178. doi.org/10.1111/brv.12651

10. **Amodio P**, Boeckle M, Jelbert S, Ostojić L, & Clayton NS (2020). How flexible is tool use in Eurasian jays (*Garrulus glandarius*)? ***Animal Behavior and Cognition***, 7(3): 270-287. doi.org/10.26451/abc.07.03.02.2020
9. **Amodio P**, Fiorito G, Clayton NS, & Ostojić L (2019). Commentary: A Conserved Role for Serotonergic Neurotransmission in Mediating Social Behavior in Octopus. ***Frontiers in Behavioral Neuroscience***, 13: 185. doi:10.3389/fnbeh.2019.00185
8. **Amodio P**, Boeckle M, Schnell AK, Ostojić L, Fiorito G, & Clayton NS (2019). Shell Loss in Cephalopods: Trigger for, or By-Product of, the Evolution of Intelligence? A Reply to Mollo et al. ***Trends in Ecology and Evolution***, 34: 690-692. doi:10.1016/j.tree.2019.05.005.
7. **Amodio P**, Boeckle M, Schnell AK, Ostojić L, Fiorito G, & Clayton NS (2019). Grow Smart and Die Young: Why Did Cephalopods Evolve Intelligence? ***Trends in Ecology and Evolution***, 34: 45-56. doi.org/10.1016/j.tree.2018.10.010.
6. **Amodio P** (2019). Octopus intelligence: The importance of being agnostic. ***Animal Sentience*** 26(20). doi: 10.51291/2377-7478.1507
5. **Amodio P**, Jelbert S, & Clayton NS (2018). The interplay between psychological predisposition and skill learning in the evolution of tool use. ***Current Opinion in Behavioral Science***, 20: 130-137. doi.org/10.1016/j.cobeha.2018.01.002.
4. **Amodio P**, Andrews P, Salemme M, Ponte G, & Fiorito G (2014). The use of artificial crabs for testing predatory behavior and health in the octopus. ***ALTEX***, 31: 494-499. doi.org/10.14573/altex.1401282
3. Tricarico E, **Amodio P**, Ponte G, & Fiorito G (2014). Cognition and Recognition in the Cephalopod Mollusc *Octopus vulgaris*: Coordinating Interaction with Environment and Conspecifics. In ***Biocommunication of Animals*** (pp. 337-349). Springer Netherlands. doi.org/10.1007/978-94-007-7414-8_19
2. Josef N, **Amodio P**, Fiorito G, & Shashar N (2012). Camouflaging in a Complex Environment. Octopuses Use Specific Features of Their Surroundings for Background Matching. ***PloS ONE***, 7:e37579. doi.org/10.1371/journal.pone.0037579
1. **Amodio P**, & Fiorito G (2013). Observational and other types of learning in Octopus. In: Menzel, R. & Benjamin, P. (Eds.). ***Invertebrate Learning and Memory***. Elsevier. doi.org/10.1016/B978-0-12-415823-8.00023-X

FELLOWSHIPS & GRANTS

- 2024 **National Geographic Society Meridian Grant. Role: PI**
 Title: OCEAN-ROBOCTO: unveiling Octopus CollaborativE hunting with fish through ANimal-ROBOt interaCTiOns. The project will investigate collaborative hunting between octopus and fish in collaboration with Alex K Schell (University of Cambridge, UK), Eduardo Sampaio and Liang Li (Max Planck Institute of Animal Behavior, Konstanz, Germany), Donato Romano (Scuola Superiore Sant'Anna, Pisa, Italy) and Isabella Fiorello (University of Freiburg, Germany).
 Amount: € 149,132.00 USD
- 2023 **PRIN (Progetto di Rilevante Interesse Nazionale). Role: Co-PI**
 Title: COSMIC "Controlled Space Microecological system supporting eCopoiesis". The project will develop an autonomous micro-ecosystem for space research in collaboration with Donato Romano (Scuola Superiore Sant'Anna, Pisa, Italy) and Adriano di Giovanni (Gran Sasso Science Institute, L'Aquila, Italy)
 Amount: € 206.000
- 2022 **'Japan Meets Italian Scientists' grant, Italian Embassy in Tokyo. Role: PI (Declined)**
 Support to conduct a behavioural study on octopus defense strategies in collaboration with Prof. Jonathan Miller at the Okinawa Institute of Science and Technology (OIST), Japan.
 Amount: € 2.200
- 2020 **National Geographic Society Covid-19 Supplemental Support Grant. Role: PI**
 Funding to cover costs of cancelled travel plans (due to the Covid-19 pandemic) for conducting the project funded through the National Geographic Early Career Grant (see below for details).
 Amount: \$ 2,207

- 2020 **Leverhulme Study Abroad Studentship**
 Funding to investigate the cognitive flexibility of the common octopus (*Octopus vulgaris*) and to assemble a brain-size dataset for Mediterranean cephalopods in compliance with ethical and animal welfare principles.
 Amount: **£ 42,000** + research expenses
- 2020 **Explorer Club OceanX Grant. Role: PI**
 Title: Seeking the social octopus in the wild. The project represents the first field-based investigation of the 'Larger Striped Pacific Octopus' (LSPO), a rare and uniquely social species of octopus. The research is being conducted in Baja California, Mexico, in collaboration with Dr. Gustavo Hinojosa-Arango (CONACYT), and Prof. Roy Caldwell (Univ. of California, Berkeley).
 Amount: **\$ 4,569**
- 2020 **Association for the Study of Animal Behaviour (ASAB) Research Grant. Role: PI**
 For details see above.
 Amount: **£ 4,458**
- 2020 **Malacological Society of London, Research Grant. Role: PI**
 For details see above.
 Amount: **£ 1,500**
- 2019 **National Geographic Society Early Career Grant. Role: PI**
 For details see above.
 Amount: **\$ 8,650**
- 2019 **Linnean Society of London, Percy-Sladen Grant. Role: PI**
 For details see above.
 Amount: **£ 1,350**
- 2019 **Cambridge Philosophical Society Research Studentship for a promising piece of work.**
 The scholarship covered living expense incurred during the writing-up of my PhD thesis and the production of two manuscripts.
 Amount: **£ 1,500**
- 2018 **Animal Behavior Soc. Student Research Grant.**
 Support to conduct a research project on physical cognition in common octopus at the SZN, Italy.
 Amount: **\$ 2,000**
- 2018 **Malacological Society of London Research Grant.**
 For details see above.
 Amount: **£ 1,500**
- 2018 **Erasmus+ Traineeship Grant.**
 For details see above.
 Amount: **€ 2,981**
- 2018 **Sidney Sussex College Research Fund.**
 For details see above.
 Amount: **£ 500**
- 2018 **Dept. of Psychology (Univ. of Cambridge) Fieldwork Fund.**
 For details see above.
 Amount: **£ 2,100**
- 2017 **Cambridge Philosophical Society Travel Grant.**
 For details see above.
 Amount: **£ 200**
- 2017 **Experimental Psychological Society Study Visit Grant.**
 For details see above.
 Amount: **£ 3,000**
- 2017 **Dept. of Psychology (Univ. of Cambridge) Fieldwork Fund.**
 For details see above.
 Amount: **£ 1,850**

2017 **Erasmus+ Traineeship Grant.**

For details see above.

Amount: **£ 1,894**

2017 **Sidney Sussex College Research Fund.**

For details see above.

Amount: **£ 500**

2016 **Research Scholarship, Accademia dei Lincei.**

Support to study tool use abilities in Eurasian jays at the University of Cambridge, UK.

Amount: **€ 6,500**

2015 **CephInAction, Short Term Scientific Mission (STSM) supported through FA 1301 Cost Action.**

Title: 'Two novel methodological approaches to investigate the social behavior of octopus in the wild'. I used mirrors as tools to study octopus's social behavior in the wild, finding that self-reflected images trigger avoidance behavior and camouflage in small size individuals but agonistic display in larger individuals. The study was conducted in Fajal, Azores, Portugal, in collaboration with Dr. Joao Goncalves (Universidade dos Acores, Portugal).

Amount: **€ 2,500**

2013 **Fieldwork Scholarship, University of Zurich.**

Contribution toward travel cost of fieldwork research at Tuanan, Indonesia, and purchase of tree-climbing gear.

Amount: **CHF 2,700**

2012 **Fee reduction award, University of Firenze.**

Contribution toward University fees, awarded on the basis academic productivity and merit.

Amount: **€ 800**

2007 – 2008 **Erasmus Fellowship, EU.**

Contribution toward living cost during 1 year study abroad (Bachelor) at the Universidad de Granada, Spain.

Amount: **€ 3,600**

SELECTED CONTRIBUTIONS TO CONFERENCES

2022 **Amodio P**, & Fiorito G. Mirror self-recognition in the octopus: a pilot study. Poster. Cephalopod International Advisory Council (CIAC) April 2nd-8th 2022, Sesimbra, Portugal.

2021 **Amodio P**, Farrar BG, Krupenye C, Ostojic L & Clayton NS. Little evidence that Eurasian jays protect their caching by responding to cues about a conspecific's desire and visual perspective. Virtual Poster. Animal Behavior Live: Annual Online Conference. November 18th 2021

2020 **Amodio P**. Cephalopods cognitive evolution. Oral presentation, CephRes 2020 Virtual Event: biology and life history of cephalopods, September 16th-21st 2020.

2019 Marzec A, **Amodio P**, Atkmoko SSU, van Noordwijk M, & van Schaik CP. Within-population variation in nest building behaviors of Borneans orangutans. Poster, 16th Conference of the Gesellschaft fur Primatologie, February 12nd-15th 2019, Gottingen, Germany

2018 **Amodio P**, Ostojic L, Krupenye C, & Clayton NS. Can Eurasian jays (*Garrulus glandarius*) integrate others' desires and perspectives to protect their caches? Poster, X Dubrovnik Conference on Cognitive Science: Communication, Pragmatics, and Theory of Mind. May 24th-27th 2018, Dubrovnik, Croatia.

MENTORSHIP & TEACHING

2021 – 2025 Supervisor of 1 MSc thesis in Marine Biology (IMBRSea, Belgium)
Supervision of 1 Traineeship student in Marine Biology (IMBRSea, Belgium)
Co-supervisor of 1 PhD thesis in Psychology (Università Suor Orsola Benincasa, Italy);
Co-supervisor of 1 MSc thesis in Psychology (Università Suor Orsola Benincasa, Italy);
Co-supervisor of 1 BSc thesis in Natural Science (Università degli Studi di Firenze, Italy).

2016 – 2019 Demonstrator in the 'Evolution and Behaviour' course (undergraduate level) led by Dr. Ljerka Ostojic at the Dept. of Psychology & Dept. of Zoology, University of Cambridge, UK.

2017 Supervisor for 2 undergraduate students in Psychology at the University of Cambridge, UK

TECHNICAL SKILLS

Languages	Italian (mother tongue); English (proficient); Spanish (advanced)
Animal behaviour and cognition	15 years of experience in devising, conducting and analysing experiments and observations on non-human animals (cephalopods, birds, primates) both in the lab and field.
SCUBA diving	SSI certificates: Advanced Adventurer; Rescue Diving; Deep Diver; First Aid Practitioner. >200 scientific dives in the Mediterranean, Atlantic, Pacific and Red Sea
Tree climbing	proficient skills developed in the peat-swamp forest of Borneo (Indonesia) to study wild orangutans
Statistics	Applied to the study of animal behaviour and cognition with R

PEER-REVIEW & GRANT REFEREE

Ad hoc reviewer for: *Nature Communications*, *Proceedings RSB*, *PNAS Nexus*, *Marine Ecology*, *Scientific Reports*, *Learning & Behavior*, *Estuarine, Coastal and Shelf Science*, *Animal Behavior and Cognition*, *Ethology*, *eLife* (member of the pool of early-career reviewers).

Ad hoc reviewer for Swiss National Science Foundation (SNSF) and Templeton World Charity Foundation.

SELECTED PRESS

New York Times, The Atlantic, National Geographic Italy, RSI (Radio, Switzerland), CBC (Radio, Canada), SciTech Now (Television, USA), RAI Radio 3 (Italy), RAI 1 (Television, Italy).