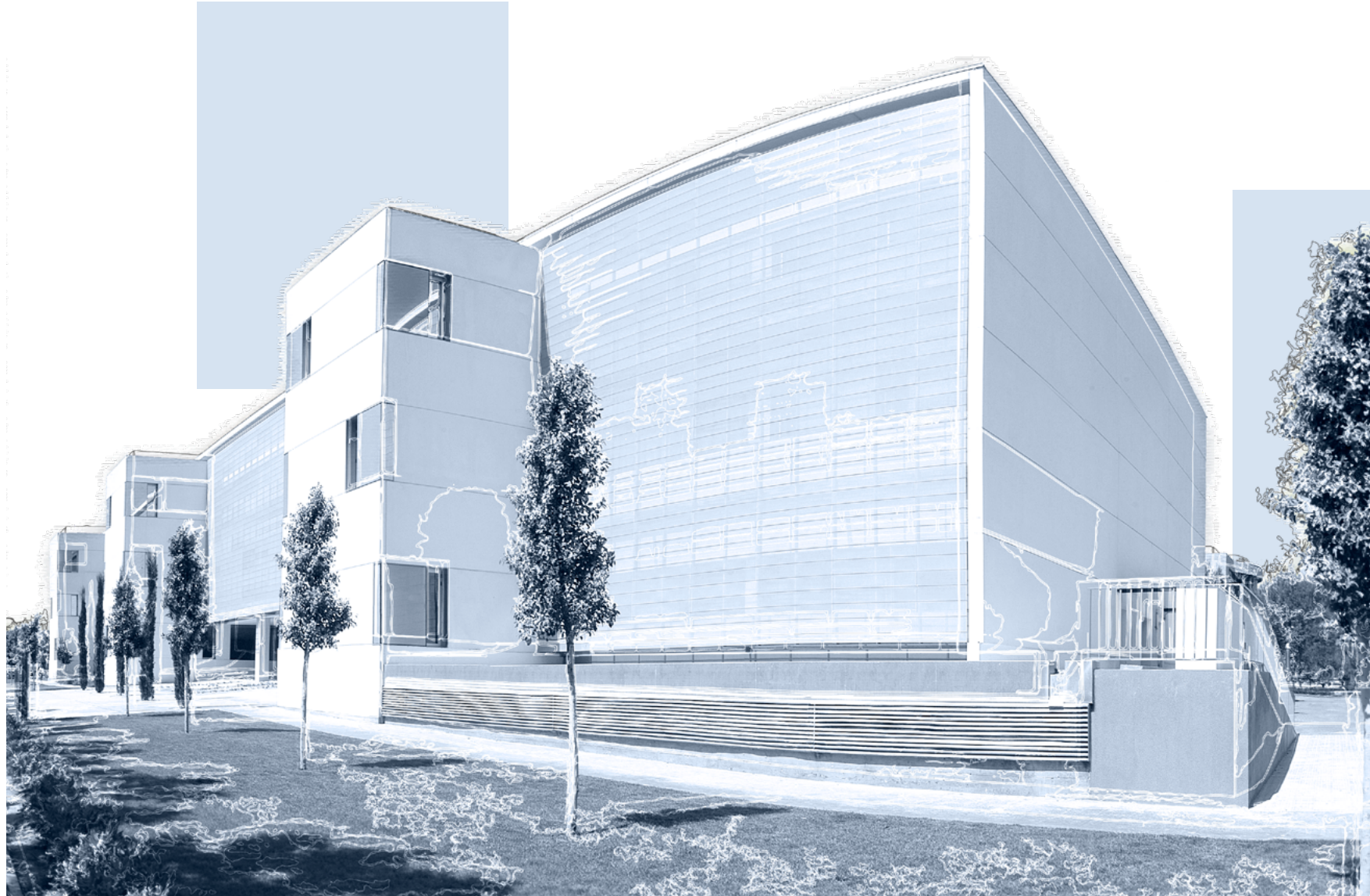




The Remedios Caro Almela Chair & Prize

Instituto de Neurociencias & the Martínez-Caro Family



Prof. Carlos Belmonte

Director (1999 - 2007)



A principios del año 1998 recibí en mi despacho del IN la visita de Fernando Martínez-Ramos, amigo personal mío y también respetado empresario y filántropo local. Conocí bien sus inquietudes intelectuales y culturales, particularmente ejemplificadas por su pasión por la música clásica y su continuo esfuerzo por promover las actividades culturales. También fui consciente de los momentos difíciles que atravesaba esos días, debido a la reciente pérdida, después de una dolorosa enfermedad, de su amada esposa Remedios, una dedicada y vocacional profesora además de la madre de sus seis hijos. Fernando, hombre de acción, quiso honrar su memoria financiando un programa destinado a promover la excelencia en la investigación biomédica con el nombre de Remedios. Conocía bien nuestros esfuerzos en el Instituto para avanzar en esa dirección y escuchó mis sugerencias para materializar el proyecto. Discutimos en detalle varias alternativas y decidimos crear una Cátedra en Neurobiología para ofrecerla a un científico de alto nivel y prestigio, que pudiera actuar de asesor y modelo a seguir para los jóvenes investigadores que inician una carrera independiente en el instituto. Paralelamente, también decidimos establecer un Premio, abierto a científicos europeos en activo que lideren una línea de investigación centrada en la Neurobiología del Desarrollo en un sentido amplio. La Universidad Miguel Hernández brindó rápidamente la infraestructura administrativa y el reconocimiento académico a la cátedra. En el año 2000 se ofreció la primera Cátedra RCA al profesor Constantino Sotelo quien la ocupó durante los siguientes 12 años. El premio RCA fue otorgado por primera vez en 2006 al Dr. Barry J. Dickson, elegido por un jurado internacional de neurobiólogos del desarrollo reconocidos mundialmente. Los hijos de Remedios y Fernando compartieron y apoyaron incondicionalmente la decisión adoptada por su padre y cuando falleció en 2011, decidieron mantener el homenaje público a su madre representada por el Premio y la Cátedra, ofreciendo así un ejemplo de unidad familiar y amor filial. Todos los investigadores y personal del IN, incluyéndome a mí, apreciamos enormemente que a pesar de las incertidumbres de los últimos tiempos la familia haya mantenido firme su decisión de apoyar la investigación y la visibilidad del IN hasta el día de hoy.

Carlos Belmonte

At the beginning of the year 1998, I received in my office of the IN the visit of Fernando Martinez-Ramos, a personal friend for me and also a respected local businessman and philanthropist in the province of Alicante. I knew well his intellectual and cultural inquietudes, particularly exemplified by his passion for the classic music and his continuous efforts to promote cultural activities. I was also fully aware of the difficult moments that he was traversing these days, due the recent loss of after a painful disease of his beloved and lifelong wife, Remedios, a dedicated and vocational teacher and the mother of his six children. Fernando, a man of action, wanted to honor her memory financing a program with Remedios's name, aimed at promoting excellence in biomedical research. He knew very well our efforts at the IN to advance in that direction, and wished to hear my suggestions to materialize the project. We discussed in detail various alternatives and decided to create a Chair in Neurobiology to be offered to a senior, prestigious scientist, which could act both as advisor and role model for the numerous young researchers then initiating their independent research career at the institute. In parallel, we also decided to establish a Prize, open to active scientists leading a research line focused on Developmental Neurobiology in a broad sense and currently working in a European institution. The University Miguel Hernandez provided readily the administrative infrastructure and academic recognition to the chair. In the year 2000, the first RCA Chair was offered to Professor Constantino Sotelo who occupied it for the following 12 years. The RCA Prize was awarded for the first time in 2006 to Dr. Barry J. Dickson, elected by an international jury of world-recognized developmental neurobiologists. The children of Remedios and Fernando shared and supported unconditionally the decision adopted by their father and when he passed away in 2011, they decided to keep the public homage to their mother represented by the Prize and the Chair, thereby offering an example of filial love and brother's unity. Despite the uncertainties of the last times, their decision has been maintained up to today, something that all the researchers and personnel of the IN, including myself, greatly appreciate.

Carlos Belmonte



Prof. Juan Lerma

Director (2008 - 2016)



Uno de mis compromisos durante los 8 años como Director del IN fue coordinar la Cátedra Remedios Caro Almela (RCA) de Neurobiología del Desarrollo. Durante estos años, la Familia Martínez-Caro y yo mismo, decidimos expandir la cátedra al campo de la neurobiología, posibilitando la Elección del Prof. Richard Morris para suceder al Prof. Constantino Sotelo como Presidente de la RCA en 2013. También tuve el privilegio de organizar la ceremonia de entrega del Premio RCA en 6 ocasiones y colaborar, primero con Fernando Martínez-Ramos, y más adelante con sus hijos, en esta tarea. Quiero destacar aquí tres aspectos de la relación con la familia a lo largo de estos años. Primero, que Fernando nos visitaba regularmente y tuve el verdadero placer de tener memorables conversaciones con él en las que repasamos diversos aspectos de la vida social, cultural y científica. Fernando tenía un conocimiento extraordinario de la música clásica y me beneficié de sus explicaciones y experiencias regulares de asistir a los conciertos más importantes del mundo. También repasamos los hitos del IN y otros hallazgos científicos con implicaciones generales y tengo que decir que Fernando siempre seguía mis explicaciones con sumo interés. Segundo, Fernando y su familia reforzaron su objetivo de mantener el Premio RCA en los más altos grados de excelencia y, como resultado, los comités ad-hoc internacionales eligieron a investigadores de primer nivel como sus destinatarios, lo que resultó en el impresionante salón-de-la-fama que podemos apreciar en este dossier. Y tercero, la pasión de Fernando por la cultura, la ciencia y la filantropía que supo transmitir a sus hijas e hijo, propició la continuidad de la Cátedra y sus actividades hasta el día de hoy, por lo que todos los que integramos el IN estamos sinceramente agradecidos. De hecho, quisimos reconocer este apoyo otorgándole a Fernando nuestra máxima distinción, la Medalla de Oro del IN, que en ese momento solo ostentaban Su Majestad la Reina Sofía y Carlos Belmonte. Fui testigo de la emoción y el sincero agradecimiento de Fernando cuando le comuniqué durante nuestra fiesta de Navidad la decisión de la Junta Directiva del Instituto, y sé que leyó la carta de adjudicación en su reunión familiar en Alicante por Navidad. Desafortunadamente, esta fue la última vez que lo vi, pero no he olvidado sus visitas y largas conversaciones y siempre lo recordaré como una persona cálida y encantadora a la que todos debemos crédito y gratitud. Finalmente, me gustaría destacar la interacción en los últimos años con sus hijas, Ana y Natalia, como representantes de la familia que han continuado el camino amable que tan bien supo trazar Fernando.

Juan Lerma

During 8 years as Director of the IN, I had the commitment to coordinate the Remedios Caro Almela (RCA) Chair of Developmental Neurobiology, a chair that together with the Martínez-Caro Family, decided to expand to the field of neurobiology, making possible the election of Prof. Richard Morris to succeed Prof. Constantino Sotelo as the RCA Chairperson in 2013. In addition, I had the privilege of organizing the RCA Prize award ceremony on 6 occasions, and collaborating with Fernando Martínez-Ramos, first, and with his children later in this endeavor. I would like to highlight 3 aspects of this enjoyable activity. First, Fernando visited us regularly and I had the real pleasure of having memorable conversations with him in which we reviewed various aspects of social, cultural and scientific life. Fernando had an extraordinary knowledge of classic music and I benefited from his explanations and regular experiences of attending the most important concerts in the world. We also went over the IN milestones and others findings with general implications and I must admit that Fernando followed my explanations with extreme interest. Secondly, he and his family always reinforced the goal of keeping the RCA Award at the highest levels and, as a result, international ad-hoc committees chose first class researchers as their recipients, resulting in an impressive hall of fame. Third, Fernando's passion for culture, science and philanthropy, which he was able to transmit to his daughters and son, led to the continuation of the Chair and its activities to this day, for which all of us at the IN are grateful. In fact, we wanted to recognize this support by awarding Fernando our highest distinction, the IN Gold Medal, which at that time only Her Majesty Queen Sofía and Carlos Belmonte held. I witnessed Fernando's emotion and sincere gratitude when I informed him during the IN Christmas party of the decision of the IN Board of Directors, and I know that he read the awarding letter to his family gathering in Alicante for Christmas. Unfortunately, this was the last time I saw him, but I must say that I have not forgotten his visits and long conversations and that I always remember him as a warm and charming person to whom we all owe credit and gratitude. But I must also say, that from that moment on, the interaction with his daughters, Ana and Natalia, as representatives of the family, followed the same kind path, which Fernando knew how to pave so well.

Juan Lerma



The Remedios Caro Almela Chair



<http://in.umh-csic.es/RCAchair.aspx>





Professor Constantino Sotelo
Emeritus Investigator at the Institut de la Vision,
Paris (France)

“Over the years, this prize has become the most important award in Developmental Neuroscience and has greatly helped all the laureates in their respective careers. All the former winners are undisputed leaders of this discipline”.”

Constantino Sotelo was the first holder of the Chair of Developmental Neurobiology “**Professor Remedios Caro Almela**” and he is Emeritus Investigator at the Institut de la Vision (UMR-968 INSERM) Paris (France). Constantino Sotelo was born in La Coruña in 1937, graduated in Medicine from the Complutense University of Madrid and completed his doctoral thesis under the direction of Professor Fernando de Castro, one of Ramón y Cajal’s most brilliant disciples. He expanded his research training at the Universities of Cologne, La Sorbonne and Harvard. He has held positions of great responsibility, such as director of Unit 106 of INSERM (Development-Evolution Neuromorphology) and director of the Federative Institute of Neurosciences Pitié-Salpêtrière, and the president of the European Society of Neurosciences.

His work on the formation of neural circuits in the cerebellum and the molecules that govern neuronal migration, as well as growth and guidance of axons during brain development has been widely awarded and highlighted. He is the author of more than 200 scientific publications in the highest ranking journals, has been a guest speaker at the most prestigious universities, international congresses and monographic meetings on the development of the nervous system, and has been part of the editorial committees of the most important neuroscience magazines of the world. Awarded by the Ipsen Foundation for his studies on neuronal plasticity, he is a member of the European Academy and, in Spain, an honorary doctorate from the University of Seville.



Professor Richard G.M. Morris
The University of Edinburgh

“Scientific Prizes recognise both relevance and excellence. The Remedios Caro Almela Prize is unique in the world in recognising scientific research on what matters most – the developing brain.”

Richard Morris is Professor of Neuroscience at the University of Edinburgh and holds the Honorary Chair “Prof. Remedios Caro Almela” in Alicante. He studied the Natural Sciences Tripos at the University of Cambridge and completed his D.Phil at the University of Sussex. His early career included a period helping to build an exhibition at the Natural History Museum and working for the Science and Features Department of BBC Television (notably on “Tomorrow’s World”). More recently, he was seconded from Edinburgh to serve as Head of Neuroscience and Mental Health at the Wellcome Trust from 2007 to 2010, where he helped to set up the new Sainsbury-Wellcome Centre for Neural Circuits and Behaviour at University College London and a new research charity MQ:Transforming Mental Health.

The longstanding research interest of his group in Edinburgh has been in the neurobiology of cognition, particularly the role neuronal plasticity in memory formation. He developed novel techniques for studying spatial memory, discovered the role of NMDA receptor activity in the hippocampus for the formation of memory, and both theoretical concepts and experimental work on the selectivity of memory retention. More recently, and very relevant to **Remedios Caro Alemela**, he also has developed interests in animal models of social behaviour in relation to neurodevelopmental disorders. He now works in a team led by Adrian Bird and Peter Kind in the Simons Institute for the Developing Brain in Edinburgh. In 2016, he was a co-recipient with Tim Bliss and Graham Collingridge of the international Brain Prize (Lundbeck Foundation, Copenhagen) for their work on the role of synaptic plasticity in memory formation. He was elected to Fellowship of the Royal Society in 1997, the Academy of Medical Sciences (1999) and the National Academy of Sciences (USA) in 2020. He was appointed CBE in 2007.



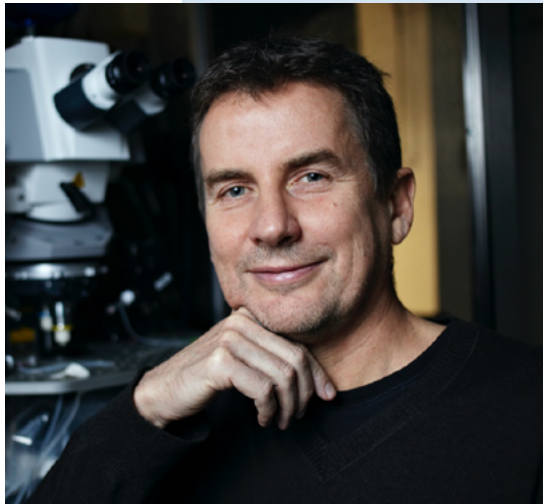
The Remedios Caro Almela Prize

For Research in
Developmental
Neurobiology



<http://in.umh-csic.es/RCAprize.aspx>





Professor Barry J. Dickson
Queensland Brain Institute, University of Queensland, Australia.

"To be awarded the very first Remedios Caro Almela Prize was therefore not just an important recognition for my lab, but also affirmed the importance of the model organism we had chosen to study."

We study the brain of the fruit fly *Drosophila*, trying to understand how it is wired up during development, and how that wiring leads to innate behaviour. Sometimes people ask me "Do flies have brains?". Even neuroscientists studying the brains of larger animals sometimes ask "What can we learn from the fly?" To be awarded the very first Remedios Caro Almela Prize was therefore not just an important recognition for my lab, but also affirmed the importance of the model organism we had chosen to study. The work for which we received the prize helped to show that fly brains are wired up in much the same way as the brains of humans and other animals. Families of extracellular ligands and receptors guide axons towards their future synaptic partners, in part by engaging intracellular signalling pathways that regulate the actin cytoskeleton. We and others discovered that the same families of guidance molecules are present in flies, mice, and humans, and sometimes even control very similar processes, such as whether or not an axon grows across the midline. The beauty of *Drosophila* is its simplicity and stereotypy, and the facile genetic methods it offers, allowing us to examine these processes at the resolution of single identifiable neurons.

Precise neuronal wiring matters because it forms the neural circuits that generate an animal's innate behaviours - the "rules of thumb" it uses to survive and ultimately reproduce in the complex and challeng-

ing environment in which it happens to be born. How, ultimately, are such innate behaviours encoded in the genome? In the years since receiving the Remedios Caro Almela Prize, my group has turned its attention to this question, taking the fly's elaborate mating rituals as a model. While the brains of flies, mice, and humans are all quite similar at the molecular and cellular levels, they are obviously very different at the circuit level. After all, each species has its own unique way of life, for which it needs its own characteristic set of innate behaviours. Nonetheless, these distinct behaviours are likely to rely on common types of circuit architecture, which in turn may be assembled by common developmental processes. In the decade since receiving the Remedios Caro Prize, my group has been able to trace out the neural circuits in the both the male and the female brain that allow each sex to perform its part in the mating ritual. Now, our work is coming full circle as we seek to understand how these mating circuits are wired up during development. By answering this question, we will be able to explain how a specific set of genetic instructions are read out to build the neural circuit that drives an innate behaviour. For this one model system, we will have defined the entire developmental process from genes to behaviour. We hope that this understanding will serve as a paradigm and inspiration for those seeking to explain even more complex behaviours in other species, including humans.





Professor François Guillemot
The Francis Crick Institute, London, UK.

“The Prize is a strong proof that our research matters to the scientific community beyond the circle of like-minded scientists we usually interact with.”

We study neural stem cells, the cells at the origin of the whole nervous system. We are particularly interested in the molecules that determine the number and type of progenies that neural stem cells produce during development of the brain, but also in adults, where neural stem cells contribute to the control of mood and memories.

We scientists work within a small community of experts in the same field and we may legitimately question the significance of our work for the wider scientific community and beyond. **The Remedios Caro Almela Prize**, as a prominent scientific prize and the only one for the field of Developmental Neuroscience, has been very important to me, but also to the junior members of my lab, as a strong proof that our research matters to the scientific community beyond the circle of like-minded scientists we usually interact with.

The Prize has certainly contributed to give my lab a high profile in the neuroscience community, and has thus helped me hire brilliant trainees, obtain funding for our research, and position ourselves to make further scientific advances.



Professor Rüdiger Klein
Max Planck Institute of Neurobiology in Munich, Germany.

“This prestigious award allowed me to highlight our efforts in developmental brain research.”

My group investigates the ways nerve cells communicate with each other during the formation of the embryonic mouse brain. The formation of functional circuits is dependent on the precise navigation of nerve cells and their cellular processes (axons and dendrites) to their final destinations. The cells explore their environment for the presence of biochemical signals that can be either attractive or repulsive. While these studies have witnessed the discovery of many new guidance molecules, our understanding of their roles in neural circuit formation has remained fragmentary.

The receipt of the **Remedios Caro Almela Prize** in 2008 came at a time when neuroscience research shifted more and more away from developmental research to the functional dissection of adult brain circuits and their contribution to specific behaviours. This prestigious award allowed me to highlight our efforts in developmental brain research, to recruit highly talented young researchers to this important field, and to obtain generous funding from the European Research Council.



Professor Steve Wilson
University College London, UK.

"It is the only major prize in Developmental Neuroscience and consequently has very high visibility in the broader neuroscience community."

Our group studies the development and early function of the brain and eyes. We investigate these processes in developing zebrafish using a wide variety of genetic, imaging and behavioural approaches. Young zebrafish are particularly well suited to such studies as their transparency allows us to easily visualise all cells in the developing nervous system of both normal fish and fish carrying genetic mutations that disrupt the formation of the central nervous system. For instance, one focus for our work is to try to understand how and why asymmetry arises between the two sides of the brain. Genetic mutations that lead to reversal of handedness or loss of brain asymmetry are not only informing the developmental pathways that lead to lateralisation but also enabling us to determine the behavioural consequences if this process is disrupted.

The award of the **Remedios Caro Almela Prize** was a real highlight in my career and has had a major impact on the visibility and impact of our research. It is the only major prize in Developmental Neuroscience and consequently has very high visibility in the broader neuroscience community. It increased our group's profile outside of our immediate research field and has helped us to recruit fantastic junior scientists from all over the world to our research team. It has also strengthened my friendship and interactions with colleagues in Alicante and with the other winners of the Prize.



Professor Christine E. Holt
University of Cambridge, UK.

“This prestigious award was instrumental in enabling to strengthen my research, particularly in the new area of mRNA-based mechanisms of nerve growth.”

Christine Holt's group investigates how nerve connections are formed in the developing visual system. Neurons in the eye send out long processes, named 'axons', that navigate over long distances in the brain to reach their target cells. She and her colleagues have identified some of the molecular mechanisms that underlie how axons are guided to their targets and how these connections are maintained throughout life. For example, they found that axons are guided across the optic chiasm by a repellent guidance molecule (Ephrin-B) and out of the eye by two attractant molecules (Netrin-1 and laminin). Her group discovered that a dynamic repertoire of mRNAs resides in growing and mature axons and showed that their local translation provides an on-demand supply of new proteins that facilitates both the formation and maintenance of neural circuitry. The findings have opened up potential new avenues for therapies in neurological disorders and repair.

Christine Holt was the recipient of **The Remedios Caro Almela Prize** in 2011. This prestigious award had a significant impact on her career. It was instrumental in enabling her to strengthen her research, particularly in the new area of mRNA-based mechanisms of nerve growth. Her discovery of local mRNA translation in axons was still controversial at the time and the award helped to raise the profile of her work and to give it important validation. The award also introduced her to valuable new scientific colleagues in Alicante and beyond and helped her to establish enduring relationships that have led to important scientific exchanges over the years.



Professor Magdalena Goetz
Helmholtz Zentrum, Munich, Germany.

"It helped a lot to invest in a new project area in our developmental work: the heterogeneity of centrosome composition and its relevance for development and neurodevelopmental disorders."

The Götz lab examines the mechanisms of neurogenesis in the developing and adult forebrain. Their discovery of radial glial cells acting as neural stem cell generating also neurons led them towards utilizing the knowledge about neurogenesis mechanisms for repair. They pioneered the first direct neuronal reprogramming from reactive astrocytes to neurons by transducing reactive glial cells after brain injury first with Pax6, a transcription factor this lab identified as key neurogenic regulator in development. Since then they study the mechanism of neurogenesis more comprehensively identifying many novel players, including the first nuclear factor governing brain folding, a master regulator of nuclear compartmentalization.

For us, the **Remedios Caro Almela Prize** was a particular boost for our work in development, as most prizes are given for the repair projects. It was particularly moving and rewarding to receive this prize that some of my heroes from the field of developmental neuroscience had received before, and it helped a lot to invest in a new project area in our developmental work, namely the heterogeneity of centrosome composition and its relevance for development and neurodevelopmental disorders. This has not only resulted in an important publication on the novel centrosome protein Akna in 2019, but also allowed us to collect sufficient data of this new exciting field to obtain a second advanced ERC grant.



Professor Silvia Arber
Friedrich Miescher Institute for Biomedical Research,
University of Basel and Biozentrum, Switzerland.

"This Prize was recognition and inspiration for past and current co-workers and helped to attract future co-workers."

Silvia Arber's group is interested in understanding how the nervous system controls the many different forms of body movement. Motor function develops by generation and programming of specific neurons during development. These neurons must subsequently connect to each other to form precisely wired neuronal circuits. Arber and her co-workers have identified molecular and cellular principles, by which sensory-motor circuits in the spinal cord wire up during development to generate function. They have more recently unravelled the organization and function of neurons connecting the brainstem and spinal circuits to generate diverse movements including walking or fine hand movements. Specific neurons are responsible for each of these different movements, and the foundation for this precision is laid during development.

The Remedios Caro Almela Prize was a wonderful recognition for the body of work in the Arber team on development of the motor system. It recognized the importance of dissecting at the finest level how neuronal cell types develop and connect to generate function. It helped to raise attention to the fact that development programs adult function for scientists mostly interested on mature systems. The Prize was recognition and inspiration for past and current co-workers and helped to attract future co-workers. It also generated a memorable link to the wonderful neuroscience institute in Alicante.

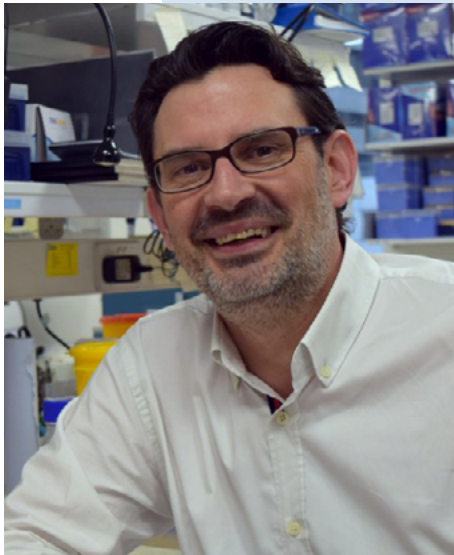


Dr. Alain Chedotal
Institut de la Vision, Paris, France.

"This award was a major recognition of the excellent work performed by all my past and present team members."

We are trying to understand how neuronal connections form during embryonic development. Our favourite models are neurons which interconnect the right and left sides of the nervous system. They are essential to coordinate our movements, but they also help us see the world in 3D and localize sounds in space. Our work showed that these neurons played an important role in brain evolution and the emergence of specific behaviours. We have identified some of the molecules which guide developing axons and migrating neurons during their journey through the brain. Our team has also developed new microscopy techniques allowing to image whole embryos in three dimensions, thereby facilitating the analysis of brain connectivity.

The Remedios Caro Almela Prize is very special to me, not only because it is the most prestigious award in Developmental Neurobiology, and the first international prize I received, but also because of the long-term relationship I built with the Neuroscience community in Alicante for almost three decades. The Prize was a major recognition of the excellent work performed by all my past and present team members. I am also deeply grateful to the Martinez-Caro family for their constant support to Developmental Neuroscience and for promoting European neuroscientists.



Professor Oscar Marín
King College London, UK.

“Science has the power of transforming our lives, and it’s only through research that we will eventually win the battle against brain disorders. The RCA Prize is a fantastic testimony of these values.”

We study how the cerebral cortex, the largest and most complex region of our brain, develops. In humans, the cerebral cortex develops over two decades. During this protracted period that begins in the embryo, small perturbations- in the form of genetic mutations or environmental insults- can alter the normal trajectory of development and ultimately disrupt normal brain functioning. We study the cell and molecular biology of brain development in rodents to understand and eventually correct these abnormalities.

Our work focuses on a very heterogeneous population of cortical neurons known as interneurons. These cells are responsible for controlling the activity of the other main class of cortical neurons, known as pyramidal cells. The function of interneurons in the cerebral cortex is like that of a conductor in a choir. They control when other neurons “sing” and synchronise their activity so that they harmonise their voices. Defects in the development of interneurons cause important alterations in the function of the cerebral cortex and lead to disorders such as epilepsy, autism, and schizophrenia.

We are in a unique position to link the relevant cellular and molecular events in the development of cortical interneurons with the emergence of functional specificity. Our work over the last years have increased our understanding of the development of cortical networks, and this is, in turn, boosting our ability to comprehend the origin of developmental brain disorders.

The Remedios Caro Almela Prize

is a unique scientific prize because it recognizes work in the field of developmental neurobiology. In only ten years, the prize has become one of the most prestigious awards in neuroscience, and its international standing continues to increase. Being awarded the Remedios Caro Almela Prize was a marvellous honour and a very inspiring recognition of the work of so many colleagues and students in our laboratory. I couldn’t be more grateful to the Remedios Caro Almela family for their support of our science.





The Remedios Caro Almela Chair & Prize





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UNIVERSITAS
Miguel Hernández



INSTITUTO DE NEUROCIENCIAS

