

Dr. Jean-Pierre Saint-Jeannet

A French Researcher's Professional Journey



Jean-Pierre Saint-Jeannet, PhD, a professor in the Department of Basic Science and Craniofacial Biology, can pinpoint the exact moment when he found his calling as a developmental neurobiologist.

“As a college student I was enrolled in a very small class in experimental embryology,” he says. “We were carrying out very meticulous dissection of different embryonic cell tissues from the larvae of newts, transplanting them to ectopic locations, and looking at the consequences.”

Week after week, Dr. Saint-Jeannet became more and more excited to attend this class at the Université Paul Sabatier, in Toulouse, France.

“What fascinated me most,” he says, “was the discovery of those cells committing to becoming a specific organ, and where they were acquiring that specific potential.”

Today Dr. Saint-Jeannet’s passion for his field is even stronger than when he was a young student of developmental biology. In his lab at NYU Dentistry, his work focuses on how craniofacial structures and sensory organs form in the embryo.

“I have been working with these types of cells for over 20 years and they continue to fascinate me,” he says.

Dr. Saint-Jeannet grew up, along with his two brothers, in L’Isle-de-Noé, a small village of about 500

people, in the Midi-Pyrénées in southwestern France. His father ran a small seed business that was started by his grandfather.

“It was essentially a coop,” he says. “My father would buy corn, sunflower seeds, and other crops from different farmers in the area and sell them on a larger scale throughout France and other parts of Europe.”

Growing up in this rural, agriculture-based region of France, Dr. Saint-Jeannet recalls having always had an interest in biology. When he was about 10 years old, he received a microscope as a Christmas present.

“I know that sounds cliché, but it’s true” he says. “My mother continues to live in my childhood home, and she still has my old microscope.”

Prior to deciding on what would become his life’s work, Dr. Saint-Jeannet toyed with the idea of becoming an archaeologist and spent several summers going on digs in the south of France and in Israel.

“I really enjoyed the research aspect of archaeology — finding things and trying to make sense of them,” he says. “That experience also influenced my interest in biological science.”

After Dr. Saint-Jeannet received his BS degree in developmental biology, he went on to do graduate work at the Université Paul Sabatier, earning a master’s degree in neuroscience and a PhD in developmental neurobiology. He had ambitions to pursue a research career abroad, but that did not immediately work out. Instead, he moved to Paris, where he began postdoctoral studies in the Laboratoire de Physiopathologie du Développement at

Left: Dr. Saint-Jeannet and Dr. Santosh Maharana, a postdoctoral associate in the Department of Basic Science and Craniofacial Biology, tend to *Xenopus laevis* frogs, which have reduced craniofacial structures reminiscent of the craniofacial defects seen in Nager syndrome patients.

Right: Dr. Saint-Jeannet and Jonathan Cooney (left) and Arun Devotta (right), both junior research scientists in the Department of Basic Science and Craniofacial Biology, use a microscope to examine embryos in which genes critical for craniofacial development have been visualized by *in situ* hybridization (ISH).



the École Normale Supérieure. There, he studied embryonic cell division in frogs under the supervision of his advisor, Dr. Jean Paul Thiery.

However, Dr. Saint-Jeannet still dreamed of working overseas. Two years later his dream was realized when he landed a second postdoctoral position in Dr. Igor B. Dawid's Laboratory of Molecular Genetics at the National Institutes of Health (NIH). While there, Dr. Saint-Jeannet continued to study embryonic cell division in amphibian species, including *Xenopus laevis*, the South African frog that plays a major role in his NYU Dentistry lab today.

Working at the NIH was an important turning point for Dr. Saint-Jeannet, who had committed originally to three years but ended up staying for five. Afterward, he had the option to return to France and take a position being held for him at a university, but he decided he wanted to stay in the US.

"I was more attracted to the American system where you are really given a chance as an assistant professor to show what you can do in a period of three to five years," he says. "Going back to France, at least back then, I would not have had the same opportunities."

Dr. Saint-Jeannet applied for a number of different positions in the US and accepted a post as an assistant professor in the Department of Animal Biology at the School of Veterinary Medicine at the University of Pennsylvania. He continued his research in developmental neurobiology and rose to become a tenured professor.

"After about 15 years, I was at a point where I could have held that position for the rest of my career," he says. "Or I could make a move."

Dr. Saint-Jeannet decided to apply for a position in NYU Dentistry's Department of Basic Science and Craniofacial Biology. After his initial

interview with department chair Dr. Nicola C. Partridge, he realized that he would have a lot of synergy with other department members who shared a common interest in craniofacial biology.

In 2011, Dr. Saint-Jeannet, along with four other new researchers involved in craniofacial and bone research, were recruited by Dr. Partridge, bringing the total number at the start of the 2011–2012 academic year to 16 faculty members across six departments, with more than \$16 million in combined grants. Their expertise provided the foundation for expanded research activities, leading to the establishment of a Center for Skeletal and Craniofacial Biology, directed by Dr. Partridge.

"It's always difficult when you make a change, not being able to see exactly what you are getting into," says Dr. Saint-Jeannet. "That said, coming to NYU Dentistry has been a tremendous opportunity for me."

In 2016, Dr. Saint-Jeannet was awarded not one, but two five-year \$2 million NIH grants to further his research.

With the first award, he is studying the cellular processes responsible for the sensory organs, including the optic lens, the olfactory epithelium (tissue in the nasal cavity that is responsible for smell), and the inner ear.

This research looks at the formation of cranial placodes, which are the thickening of the outermost layer of tissue located in the head of the developing embryo. Cranial placodes make important contributions to the paired sensory organs, differentiating into diverse cell types such as sensory organs, lens fibers, and hormone secreting cells. The overarching goals of this study are to identify therapeutic targets to treat congenital malformations in utero and reduce sensory defects at birth.

The second award is enabling Dr. Saint-Jeannet to gain insights into Nager syndrome, a rare craniofacial disorder characterized by underdeveloped cheek bones, undersized jaw, and cleft palate. These defects frequently cause feeding and breathing problems, among other maladies. Mutations in the SF3B4 gene were recently identified as a cause of Nager syndrome.

"Nager syndrome is a rare disease but we are in a unique position that could allow us to understand how mutations in this gene may cause other craniofacial conditions that are more prevalent," explains Dr. Saint-Jeannet. The long-term goals of the study are to develop tests for early detection of the disease, and strategies to minimize craniofacial malformations at birth (*see related story on p. 73*).

For Dr. Saint-Jeannet, a typical day means long hours in the lab. When he does have free time, he enjoys taking walks around the city.

"Interestingly, I am from a very small village, but I am very much a city person now, having lived in Paris, Washington, DC, Philadelphia, and New York."

While the lab is his primary home at NYU Dentistry, Dr. Saint-Jeannet also teaches first-year students in the craniofacial biology, organ systems, and neuroscience course. And he interviews prospective dental students one day a week, a role he enjoys since it helps him better understand the student body and their academic expectations.

His major focus at the moment, though, is on the investigations that his two new grants are supporting. "There are so many unanswered questions. I won't be able to finish all the work that needs to be done in my lifetime," he says, "Still it's exciting to be able to make contributions in one very specific area. After all, that's what research scientists do." ■