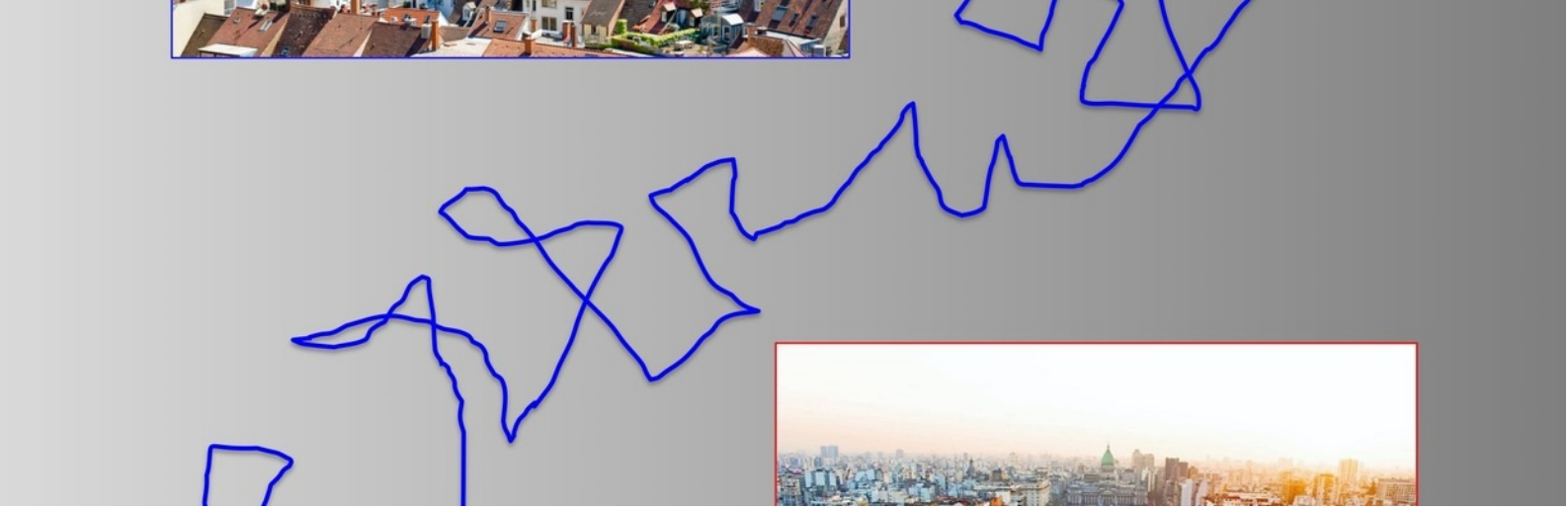

Nobel Laureate Joachim Frank receives an Honorary PhD Degree of the Universidad Nacional de Cuyo, in Mendoza, Argentina: A Journey from Freiburg to Argentina

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Submitted: 12. April 2019
Published: 20. April 2019
Volume: 6
Issue: 4
Languages: German
Keywords: Joachim Frank, Nobel Prize, single-particle cryo-electron microscopy, Universidad Nacional de Cuyo Mendoza, Argentina, honorary PhD, Christoph Borner, Roland Mertelsmann, IMBS, Albert-Ludwigs-Universität Freiburg Germany, Universidad de Buenos Aires
Categories: News and Views, Life Sciences
DOI: 10.17160/josha.6.4.556

Abstract:

Joachim Frank has discovered and developed single-particle cryo-electron microscopy (cryo-EM). He received the Nobel Prize in Chemistry in 2017 which he shared with Jacques Dubochet and Richard Henderson. Using this unique technology, he made important contributions to the structure and function ribosomes from bacteria and eukaryotes. On March 6, 2019, Joachim Frank received an honorary PhD of the Universidad de Buenos Aires. In a very special event at the Faculty of Law at CUYO on March 8,2019, he also received an Honorary PhD Degree of the Universidad Nacional de Cuyo in Mendoza, Argentina. At this event he was also honoured by the Ambassadors of Germany and Switzerland.

new JOSHA
Journal of Science, Humanities and Arts

April 2019 Volume 6, Issue 4

A Journey from Freiburg to Argentina –

Joachim Frank, March 2019

Dear Vice-Rector Dr. Jorge Barón,

Dear Dean of the Faculty of Medical Sciences Dr. Roberto Miatello,

Dear Dean of the Faculty of Basic and Natural Sciences Dr. Nestor Ciocco,

Dear Dean of the Law School Dr. Fernando Perez Lasala,
(the ceremony will take place in his faculty)

Dear Ambassador Jürgen Christian Mertens,

Dear distinguished members of the faculties:

On behalf of Professor **Christopher Borner**, Professor **Roland Mertelsmann** and myself I would like to express our heartfelt thanks and deep appreciation for the award of the Honorary Doctor from your esteemed university. It is a true honor to be recognized by one of Argentina's most prestigious institutions of higher education.

It was only recently that I got back in touch with my Alma mater, and that happened as a consequence of my Nobel award in Stockholm in December of 2017. Last year, at the end of June/beginning of July, I was invited by the Rector of the Albert-Ludwigs-Universitaet, Professor **Hans-Jochen Schiewer**, to give the annual Staudinger Lecture, and my wife Carol Saginaw and I greatly enjoyed the warm hospitality he and members of the faculty provided for us.

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Aktenzeichen:

Freiburg, 04.10.2017

Sehr geehrter Herr Kollege Frank,

zur Verleihung des Nobelpreises für Chemie sende ich Ihnen als Alumnus unserer Universität meine herzlichsten Glückwünsche.

Es macht mich als Rektor der Universität besonders stolz, Sie zu unseren ehemaligen Studierenden zählen zu können. Es freut mich, dass Sie mit Ihrem Physikstudium in Freiburg einen Grundstein für Ihre berufliche Laufbahn legen konnten.

Ich hoffe sehr, dass Sie, sehr geehrter Herr Kollege Frank, Ihre Alma Mater in guter Erinnerung behalten haben, und würde mich freuen, wenn ich Sie persönlich zum einem Vortrag an der Universität Freiburg begrüßen könnte. Dazu lade ich Sie im Namen unserer Albert-Ludwigs-Universität sehr herzlich ein.

Ich beglückwünsche Sie nochmals zu dieser ehrenvollen Auszeichnung.

Mit den besten Grüßen

Prof. Dr. Dr. h.c. Hans-Jochen Schiewer
Rektor

I'd like to mention in passing that this was an opportunity to meet friends from college again, most of whom I had not seen for 55 years.

The Staudinger Lecture -- named after Hermann Staudinger who was a lecturer at the University of Freiburg and received a Nobel Prize in Chemistry in 1953 -- was also the occasion for me to meet Professor Chris Borner. He told me about the outreach of the University in forging partnerships with universities in Argentina, which as I learned all started through the efforts of Professor Mertelsmann almost 20 years ago. I had the pleasure to meet Professor Mertelsmann just a few days ago in Buenos Aires.

Having re-connected with the faculty of the Albert-Ludwigs-Universitaet only quite recently, I find myself in the paradoxical position to give a thank-you speech on behalf of two men who have done so much in the past to establish the international collaborations between Freiburg and Argentina. Even though I am -- in a general way -- identified as a biomedical scientist by affiliation and research activity, I'm in fact a mere observer and admirer of the partnerships that Professor Dr. Roland Mertelsmann have set in motion and that now continue and flourish under Professor Dr. Chris Borner's leadership.

But let me enumerate the achievements of my co-alumni and co-honorees in more detail:

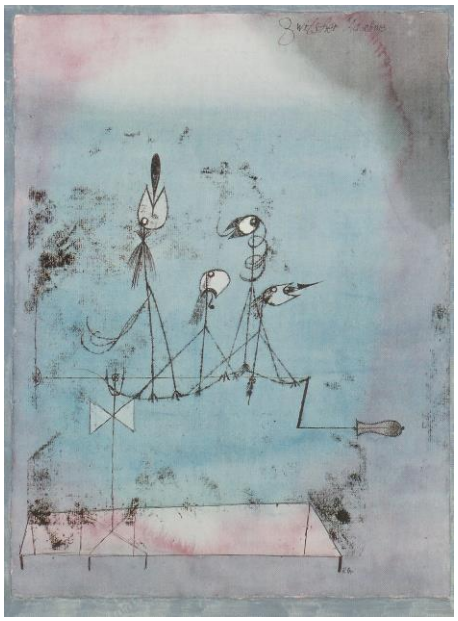
First, the International Masters Program in Biomedical Sciences (IMBS) whose origins go all the way back to the beginning 2000s, starting as I'm told with a brain storm between Prof. Mertelsmann and his Argentinean collaborator and friend **Dr. Ben Koziner** during a trip through Patagonia; **Secondly**, the postgraduate exchange program with the University of Buenos Aires, which was created ten years ago by Prof. Mertelsmann; and, **Thirdly**, most recently, since 2017, a postgraduate exchange program for medical students between Freiburg and Mendoza.

We all agree, as a matter of course, that there is a great value in all efforts of building bridges across national boundaries. During my working lifetime, which started all the way back in 1967 (counting from the start as graduate research assistant) – and especially after the advent of the Internet in the 80s and 90s with its swift world-wide communication -- Science has become a truly global human enterprise, and Science education can take advantage of the increased cosmopolitan inclination of educators and students alike.

Science and Science education are obviously no longer the only enterprises with such global span, as there is an increasing network of cultural cooperation that ignores all visible and invisible walls.

FREIBURG: At the time when I started as a student, Freiburg was my first big city – truly cosmopolitan in comparison with the provincial town (Siegen, in North-Rhine Westphalia) where I was brought up. When I arrived in Freiburg I had just missed the University's 500-year celebration by 3 years.

The time I spent in this romantic town at the foot of the Schwarzwald, walking through its Gaessle with the sounds of flowing water, now seems a distant dream. One of the most exciting discoveries I made a few days after I arrived was in a tiny bookstore right by the Cathedral: it had dozens of postcards with paintings of Paul Klee, an artist I hardly knew before, who instantly became my favorite.

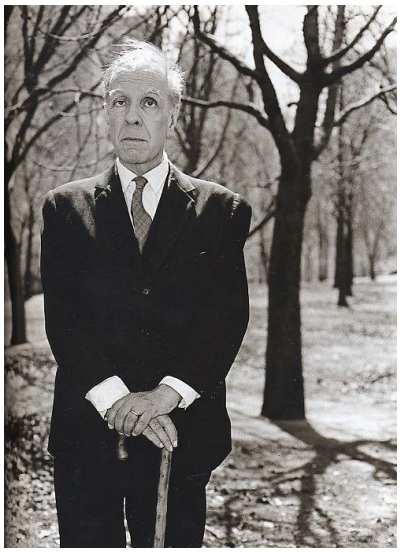


In an impulse, despite my limited budget, I bought the whole lot. When I revisited Freiburg last year I immediately tried to find this little bookstore again, which had been glued to the Cathedral wall -- but it was gone. And so it went with many things I remembered from the time, except of course the Cathedral itself, the granularity of its sandstone, the grandiosity of its design.

But beyond all those emotional attachments I remember Freiburg as the quintessential place where I first honed my reasoning powers, by spending hours on mathematical proofs in Linear Algebra and Calculus. Spoiled by sailing through Physics and, to some degree Math in high school, I experienced severe shock when I was thrown into courses that had the caliber of serious scholarship. It took me at least a year to get my bearing.

And so Freiburg marks the true beginning of my life's academic journey, which took me through many places, with unexpected twists and turns along the way. Munich, San Diego, Berkeley, Ithaca, Cambridge, Albany, New York City. I met my wife Carol along the way and she made it possible for me to keep on track and keep my sanity with my pursuit. It is with a sense of wonder that I arrive here, to be heaped with honors, in a country I have never set foot in before.

ARGENTINA. Let me at this point give a tribute to Argentina – since I'm visiting it for the first time – by describing it as it appeared on my mental map before I arrived here, only a few days ago.



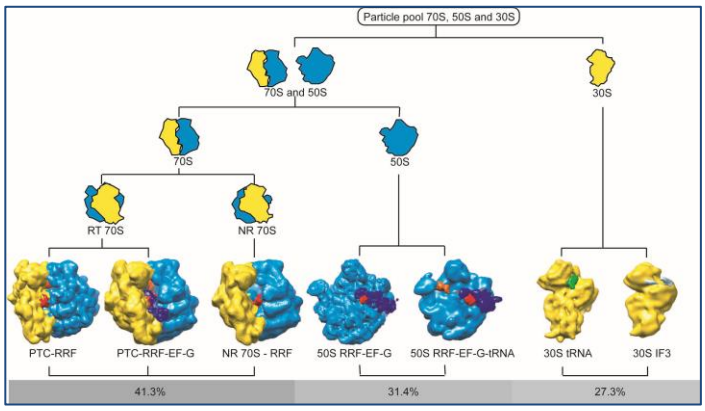
For me it has been the country of *Tloen, Uqbar, and Orbis Tertius*, the country of *Funes the Memorious* -- all constructs from the imagination of Jorge Luis Borges' fertile mind. It has been the place where the *Celestial Emporium of Benevolent Knowledge* was dreamt up:

Ancient Chinese encyclopædia entitled *Celestial Emporium of Benevolent Knowledge*. The list divides all animals into 14 categories:

- Those that belong to the emperor
- Embalmed ones
- Those that are trained
- Suckling pigs
- Mermaids (or Sirens)
- Fabulous ones
- Stray dogs
- Those that are included in this classification

- Those that tremble as if they were mad
- Innumerable ones
- Those drawn with a very fine camel hair brush
- *Et cetera*
- Those that have just broken the flower vase
- Those that, at a distance, resemble flies
-

For someone like me who uses methods of classification professionally, in cryo-electron microscopy, the classification dreamt up by Borges amounts to boundless hilarity. For me the honorary doctor at this university also carries a special added significance as Borges was recipient of this same honor in 1956.



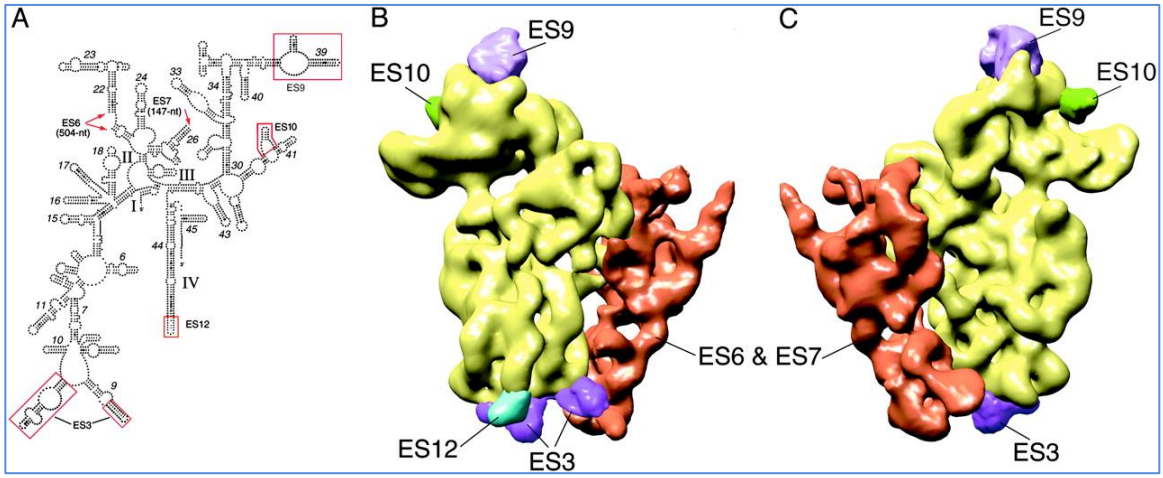
I should add that I found out about your greatest writer decades ago from my friend **Jan Groneberg**, who was himself an esoteric writer and phantast, albeit in the German language.

Already in the 70s he dreamed up a world in which experiments, especially those on animals, have become superfluous since every hypothesis can be tested by running it through a digital "Truth Filter" that checks its consistency with the entire body of existing knowledge, which is stored somewhere in a large computer center in the desert of New Mexico. I found the idea of making animal experiments obsolete quite appealing, and perhaps we are a bit closer to this capability now because of the accumulation of knowledge and the fantastic increase of computer power in the past 40 years. My friend died too early to see Artificial Intelligence making first inroads into this new terrain.

I almost -- but only almost – wound up spending a Sabbatical in Argentina years ago as I received an invitation by the University in Buenos Aires for a prestigious Visiting Professorship in 1987. But, unfortunately, the invitation arrived too late, at a time when I had already committed myself to a Sabbatical stay at the Laboratory of Molecular Biology at the MRC in Cambridge. The opportunity for a visit would not arise again because of the economic turmoil in Argentina during those years.

My most recent professional encounter with your Country was through the scientist Dr. Mariano Levin, director of the Chagas Institute in Buenos Aires, a very sympathetic and inspiring man. We met at one of the scientific meeting at the headquarters of the Howard Hughes Medical Institute in Maryland as he had obtained funding through the Institute's Foreign Investigators' program.

He proposed to me a collaboration on the structure on the ribosome of *Trypanosoma cruzi,* the parasite causing Chagas disease. With samples he supplied, Haixiao Gao, one of my postdocs, produced the first reconstruction of a trypanosomal ribosome. It was distinguished by bizarre features of ribosomal RNA expansion segments, one of which we called "the turret," in hindsight a truly Borgesian name.



The structure of the 80S ribosome from Trypanosoma cruzi *reveals unique rRNA components. (Reproduced from Gao et al., PNAS 2005)*

Mariano's life was cut short, unfortunately. He died only a few years ago, in 2011 while in his fifties. I owe to him the inspiration to later pursue the exploration of several ribosome structures from related kinetoplastids causing other devastating human diseases: Sleeping sickness and Leishmaniasis. It is a sad fact in government-funded hypothesis-driven research in the US that the combat of tropical diseases receives little attention, and I was glad to be able to make a difference while funded by HHMI, with no strings attached.

So now is the time of discovery of the real Argentina, as both anchors of my imagination, Jorges Luis Borges and Mariano Levin, are no longer here. And since Patagonia has been proven to be a place where grand dreams are born, I very much look forward to my own trip with my wife and friends just days ahead.

Let me close by re-iterating my thanks to the Vice-Rector and the Deans of your esteemed University for the high honor bestowed to Prof. Borner, Prof. Mertelsmann and me. For me this special event will forever be associated with Argentina, along with the names and memories of Jorge Luis Borges and Mariano Levin.