ENCIT2026
21st Brazilian Congress of Thermal Sciences and Engineering
08 - 12 NOVEMBER 2026
SANTOS - SP | BRAZIL
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ABCM Award

Professor José Augusto Penteado Aranha

Celso P. Pesce
Escola Politécnica, USP

ORGANIZATION
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29 anos eventus
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CAPES
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ABCM 50 ANOS Associação Brasileira de Engenharia e Ciências Mecânicas

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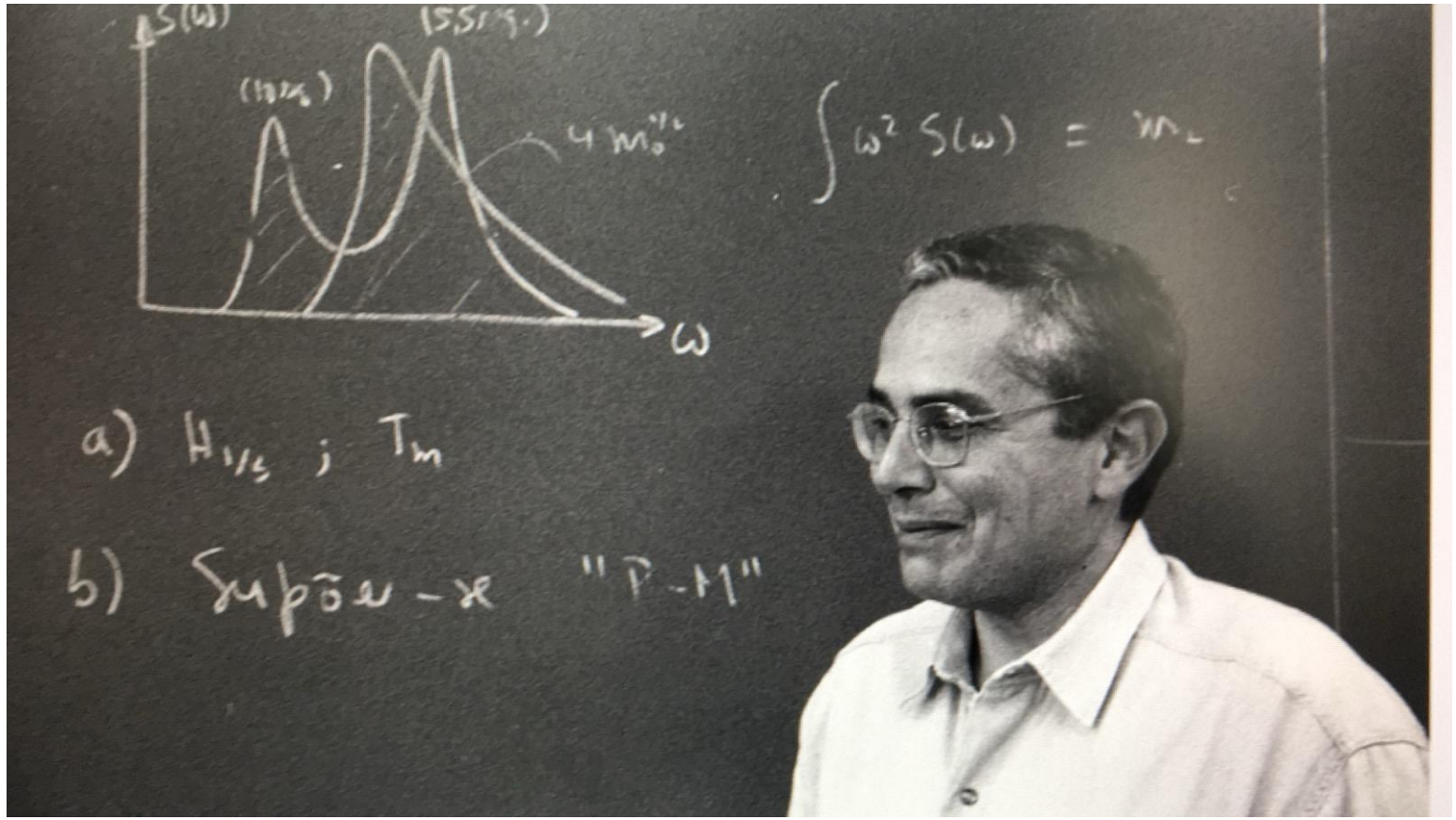

In recognition of his distinguished career as a professor and scientist, marked by outstanding professional achievements and an enduring legacy in mentoring researchers.

Academic Background & Education

- **Undergraduate Degree:**
  - Civil Engineering, Escola Politécnica, Universidade de São Paulo (1971).

- **Graduate Degrees, from the Massachusetts Institute of Technology (MIT):**
  - MSc (1975): "*Analysis of Navier Stokes Equation*", J.J. Connors
  - Ph.D. (1978): "*Nonlinear Ressonance in Wave Guides*", C.C. Mei

PhD thesis at MIT was awarded the *Arthur T. Ippen Award*.

Academic Genealogy - Prof. Jose A. P. Aranha		
Carl Friederich Gauss	(1799)	Helmstedt
Christian Ludwig Gerling	(1812)	Gottingen
Julius Plucker	(1823)	Marburg
Felix Klein	(1868)	Bonn
C. L. Ferdinand Lindemann	(1873)	Nurnberg
David Hilbert	(1885)	Konigsberg
Erhard Schmidt	(1905)	Gottingen
Salomon Bochner	(1921)	U. Berlin
Paco Axel Lagerstrom	(1942)	Princeton
Theodore Yao-Tsu Wu	(1952)	Caltech
Chiang Chung Mei	(1963)	Caltech
Jose A. P. Aranha	**(1978)**	**MIT**

Academic & Professional Career:

- **Research Leadership:** Led research groups at the Institute for Technological Research (IPT) between 1978 and 1989, before transitioning to USP.

- **University of São Paulo (USP):** Full Professor at EPUSP, serving in both the Department of Naval Architecture and Ocean Engineering (where he served as Department Head) and the Department of Mechanical Engineering.

- **Institutional Roles at USP:** Served on university governance and evaluation committees, including the Special Work Regime Commission (CERT), the Permanent Evaluation Commission (CPA), and the Editorial Board of the USP Publishing House (EDUSP).

- **Academic Honors:** Elected an Associate Member of **the Brazilian Academy of Sciences (ABC)** in 1997 and a member of **the National Academy of Engineering (ANE**).

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Role at ABCM:

16th Board of Directors Term (2006–2007)

- **President:** Valder Steffen Junior
- **Vice-President:** Antônio José da Silva Neto
- **Secretary Director:** Francesco Scofano Neto
- **Technical-Scientific Director:** *José Augusto Penteado Aranha*
- **Asset Management Director:** Su Jian

Research Focus & Contributions

- Expert in **marine hydrodynamics, fluid mechanics and Ocean Engineering**.
- Internationally recognized for research on **nonlinear ocean waves** and **currents** and their **interactions with ships, floating offshore platforms and subsea pipelines,** supporting ultra-deepwater oil exploration.

- A **pioneer in Offshore Engineering** in Brazil and one of the **mentors of Petrobras' Deepwater Program** in the early 1980s**.**

- Author of **seminal papers** in major scientific journals:

  Journal of Fluid Mechanics (9), Applied Ocean Research (8), Journal of Ship Research (4),
  International Journal of Offshore and Polar Engineering (2), Journal of Fluids and Structures (1),
  Journal of Applied Mechanics (1), International Journal of Maritime Engineering Royal Institute Of Naval Architects (1),
  Journal of The Brazilian Society Of Mechanical Sciences And Engineering (1),
  International Journal for Numerical Methods in Engineering (1), Mathematical Problems in Engineering (1)

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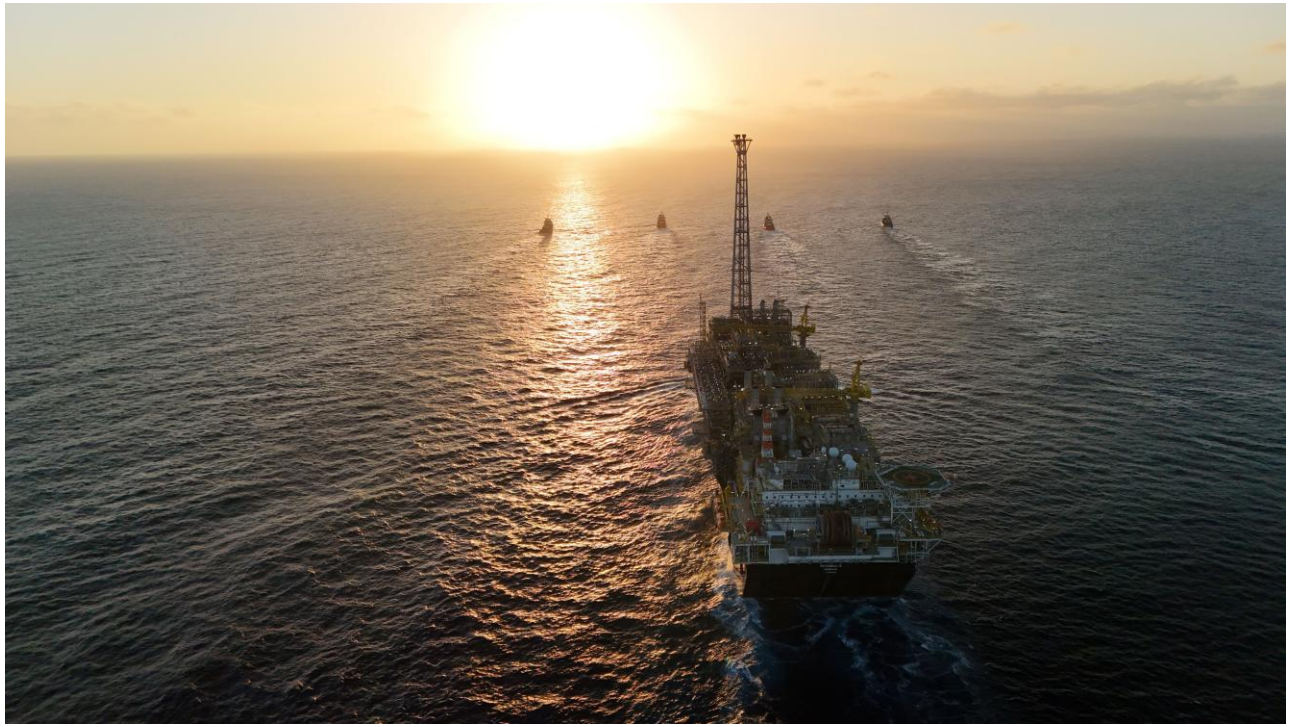

Petrobras FPSO P-78 now operating in Buzios field, ultra-deep waters, 2100 meters depth.



Petrobras P-18 semi-submersible platform. Marlim Field – 980m depth, 1998.



A major scientific achievement in nonlinear hydrodynamics:

***Aranha's Formula*: Wave-Drift Damping (WDD)**

Aranha JAP. A formula for 'wave damping' in the drift of a floating body. *Journal of Fluid Mechanics*. 1994; 275:147-155. doi:10.1017/S0022112094002314.

Aranha JAP. Second-order horizontal steady forces and moment on a floating body with small forward speed. *Journal of Fluid Mechanics*. 1996; 313:39-54. doi:10.1017/S002211209600211X

- **Core Concept:** Evaluates wave-drift damping caused by low relative forward speed or current in waves.
- **Key Innovation:** Calculates speed-dependent damping directly from standard zero-speed diffraction/radiation data, avoiding complex forward-speed computations.
- **Primary Application:** Essential for accurate time-domain simulations of slow-drift motions and mooring line tensions in floating offshore structures (FPSOs, Semi-submersibles).

A major scientific achievement in nonlinear hydrodynamics:

Aranha's formula for **Wave-Drift Damping (WDD)** is cited, recommended and incorporated into international standards, classification society rules, and industry-standard software globally:

1. DNV (Det Norske Veritas)

- **DNV-RP-C205 (*Environmental Conditions and Environmental Loads*):** DNV's primary recommended practice for environmental load calculations. It explicitly includes **Aranha's formula** in the second-order force section to estimate wave-drift damping on floating bodies.
- **DNV-RP-E301 / DNV-RP-F205:** Standards focused on the design and analysis of mooring systems and risers, where slow-drift damping computed via Aranha's formula is critical for evaluating fatigue and maximum offsets.

2. Bureau Veritas (BV)

- **NR 493 (*Classification of Mooring Systems for Permanent Offshore Units*):** Recommends Aranha's formulation to determine low-frequency wave-drift damping coefficients for floating production units (FPSOs, semi-submersibles, and SPARs).
- **HydroSTAR Manual:** Bureau Veritas's official hydrodynamic solver (*HydroSTAR*) natively implements Aranha's formula to directly generate WDD matrices.

A major scientific achievement in nonlinear hydrodynamics:

3. ABS (American Bureau of Shipping)

- **ABS Guidance Notes on Global Performance Analysis for Floating Offshore Structures:** Cites and recommends Aranha's analytical approximation to incorporate forward-speed and current effects into second-order wave drift force calculations in both time- and frequency-domain analyses.

4. API (American Petroleum Institute)

- **API RP 2SK (*Design and Analysis of Stationkeeping Systems for Floating Structures*):** The benchmark API standard for positioning and mooring design specifies the use of simplified wave-drift damping formulations based on Aranha's seminal work (1994, 1996) for accurate low-frequency response modeling.

5. Global Commercial Software Incorporating Aranha's Formula

In addition to design codes, the formula is embedded in the leading hydrodynamic and mooring software suites worldwide:

ANSYS AQWA (USA)
OrcaFlex / Orcina (UK)
SIMO / SIMA / WADAM (DNV) (Norway)
DeePLines / Principia (France)
HydroSTAR (Bureau Veritas) (France)

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Some key scientific achievements in risers and mooring dynamics:

- **Mooring Line Tension & Fatigue:** Analytical formulas for dynamic tension and fatigue prediction under combined wave-frequency and slow-drift motions.

J.A.P. Aranha, M.O. Pinto, Dynamic tension in risers and mooring lines: an algebraic approximation for harmonic excitation, *Applied Ocean Research*, Volume 23, Issue 2, 2001, 63-81, ISSN 0141-1187, https://doi.org/10.1016/S0141-1187(01)00008-6.

J.A.P Aranha, M.O Pinto, R.M.C da Silva, On the dynamic compression of risers: an analytic expression for the critical load, *Applied Ocean Research*, Volume 23, Issue 2, 2001, 83-91, ISSN 0141-1187, https://doi.org/10.1016/S0141-1187(01)00009-8.

J.A.P. Aranha, M.O. Pinto, A.J.P. Leite, Dynamic tension of cables in a random sea: analytic approximation for the envelope probability density function, *Applied Ocean Research*, Volume 23, Issue 2, 2001,93-101,ISSN 0141-1187, https://doi.org/10.1016/S0141-1187(01)00010-4.

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Some key scientific achievements in risers and mooring dynamics:

- **Riser Touchdown Zone (TDZ) Dynamics:** Asymptotics and fatigue mechanics at the seabed interaction boundary layer for Steel Catenary Risers (SCRs).

  Aranha, J.A.P., Martins, C.A., and C.P. Pesce. "Analytical Approximation For the Dynamic Bending Moment At the Touchdown Point of a Catenary Riser." Int. J. Offshore Polar Eng. 7 (1997).

  Pesce, C.P., Aranha, J.A.P., Martins, C.A., Ricardo, O.G.S., and S. Silva. "Dynamic Curvature In Catenary Risers At the Touch Down Point Region: An Experimental Study And the Analytical Boundary-Layer Solution." Int. J. Offshore Polar Eng. 8 (1998).

- **Current effects on moored FPSOs:** reduced-order models, stability and dynamic bifurcations.

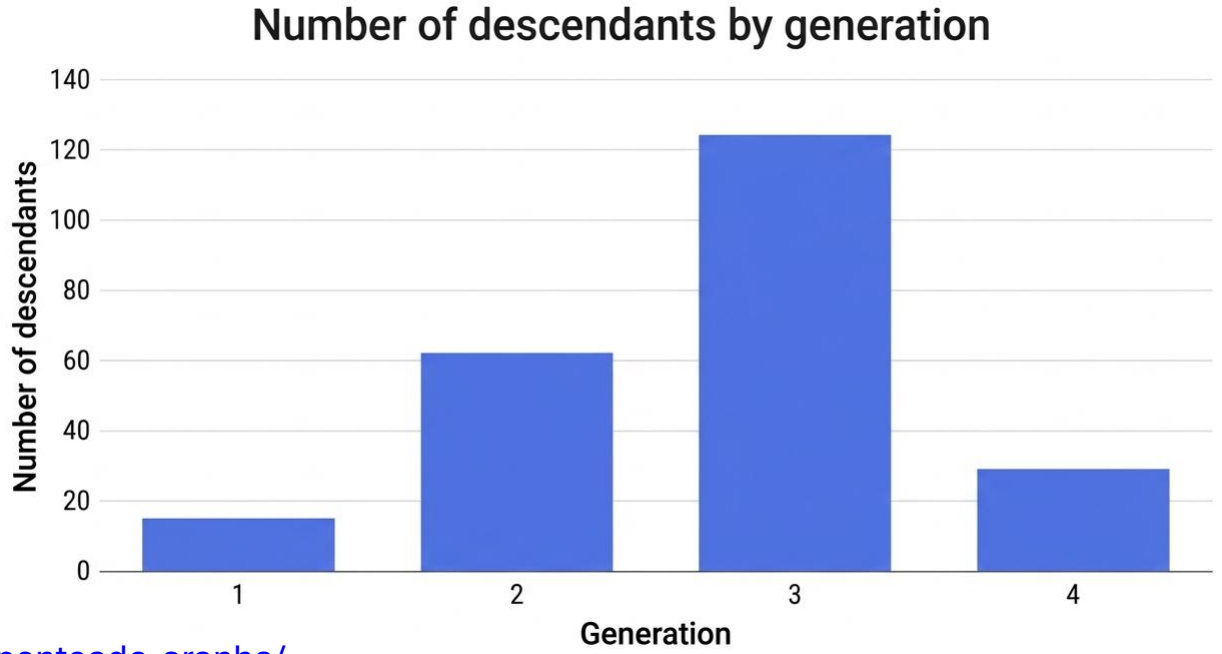
  A.J.P. Leite, J.A.P. Aranha, C. Umeda, M.B. de Conti, Current forces in tankers and bifurcation of equilibrium of turret systems: hydrodynamic model and experiments, *Applied Ocean Research*, Volume 20, Issue 3, 1998, 145-156, ISSN 0141-1187, https://doi.org/10.1016/S0141-1187(98)00002-9.

  Simos, A. N., Tannuri, E. A., Pesce, C. P., and J. A. P. Aranha. A Quasi-Explicit Hydrodynamic Model for the Dynamic Analysis of a Moored FPSO Under Current Action. *J Ship Res* 45 (2001): 289–301. doi: https://doi.org/10.5957/jsr.2001.45.4.289

However, his best accomplishments:

- ***An academic legacy, extending far beyond scientific achievements;***
- ***His warmth, friendship, and solidarity.***

Academic Genealogy Metric	Value
Academic Descendants (AD)	**230**
Genealogy Index (GI)	4
Fecundity (FI)	15
Fertility (Ft)	4
Generations (G)	4
Academic Mentorship Relations (R)	**248**



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Generation 1

N	Name	Fc
1	Andre J d P Leite	
2	Celso Nogueira	
3	Celso P Pesce	28
4	Clóvis d A Martins	17
5	Eric d Souza	
6	Jairson d Lima	
7	João V Sparano	
8	Karl P Burr	5
9	Leonídio B Junior	
10	Marcos M d O Pinto	13
11	Paulo H C d C Parra	
12	Pedro N Lavinas	
13	Ricardo Sbragio	
14	Vinícius L F Matos	

So far, 230 *academic descendants!*

Generation 2

N	Name	Fc
1	Adilson P d M Junior	
2	Adriane A F S L d Queiroz	13
3	Alessandro S Santos	
4	Alexandre N Simos	20
5	Alfonso P Gallardo	
6	Alfredo G Neto	16
7	Ana B d O Castro	
8	André L C Fujarra	27
9	Arthur H d Santos	
10	Brunno A Pesce	
11	Bruno Stupello	
12	Caio C P Santos	
13	Daniel d O Tomin	
14	Daniel R B Silva	
15	David J K Goldberg	
16	Eduardo A Tannuri	32
17	Eduardo P Júnior	
18	Eduardo R Malta	
19	Fernanda C d M Takafuji	
20	Fernanda R G d Silva	
21	Fernando G Toni	
22	Flávia M d Santos	3
23	Flavio K Maruyama	
24	Gabriel R d Azevedo	
25	Heloísa G Mendonça	
26	Humberto d C Gissoni	
27	João L B Junior	
28	João L B Júnior	6
29	João S L Cardoso	
30	José d F Bueno	
31	Julio V R Favarin	
32	Lauro M Y d Silveira	

N	Name	Fc
33	Leandro D Cunha	
34	Leonardo A Belaroza	
35	Leonardo Casetta	
36	Leonardo R Garcez	
37	Letícia S Madi	
38	Lucas Franceschini	
39	Luciano d A Campos	
40	Luiz C C Vital	
41	Luiz F S S d Silva	
42	Marcelo V Magnoli	
43	Marco A F Accurso	
44	Marcos A Rabelo	
45	Marilda Nagamini	
46	Melquisedec F d Santos	
47	Patricia K Furlan	
48	Pedro P S d P Lopes	
49	Rafael L Tanaka	
50	Rafael Salles	
51	Renato H Finoteli	
53	Renato M M Orsino	3
54	Roberto R Junior	7
55	Rodrigo d A Amarante	
56	Rodrigo P Correia	5
57	Stael F Senra	
58	Thiago W Loureiro	
59	Tiago M d Barros	
60	Tiffany I Hashiba	
61	Valdir L Anderson	
62	Wagner A D Filho	
63	William C Guttner	

Generation 3

N	Name	Fc
1	Adriana C Agostinho	
2	Adriana P Wallbach	
3	Alberto C Chapchap	
4	Alex S Huang	
5	Aline L d L Gontarski	
6	Aline M Momenti	
7	Amir M S Ad	
8	Ana L d B Orsolini	
9	Anderson T Oshiro	
10	André A M d Araújo	
11	André F Carunchio	
12	André S Bouzan	
13	André S S Ianagui	
14	Asdrubal d N Q Filho	
15	Bruno E M Barros	
16	Bruno G Leite	
17	Bruno Pegoraro	
18	Carlos H Fucatu	
19	Carlos L Pavón	
20	Carolina M d Santos	
21	Celso J F Júnior	
22	Daniel P Vieira	
23	Danilo L Ribeiro	
24	Debora N Higa	
25	Dennis M Gambarine	
26	Diogo Kramel	5
27	Douglas G T Yuba	
28	Edgard B Malta	
29	Eduardo M Bastezini	
30	Erico d S Veriscimo	
31	Fabio T Matsumoto	
32	Felipe Arditti	
33	Felipe L d Souza	
34	Felipe M Moreno	
35	Felipe R Pereira	
36	Felipe R Masetti	
37	Felipe Ruggeri	
38	Fernanda Hille	
39	Fernando G Garcia	2
40	Flaminio A F Maranhao	

N	Name	Fc
41	Fredi Cenci	
42	Gabriel d S Correia	
43	Gabriel G Matos	
44	Gabriel V P Lapa	
45	Gianluca Marchiori	
46	Guilherme D S Lula	
47	Guilherme F Rosetti	
48	Guilherme M Rangel	
49	Guilherme R Martins	
50	Guilherme R Franzini	18
51	Gustavo A Bisinotto	
52	Gustavo H S Neves	
53	Gustavo O Silva	
54	Heitor M Bernardo	
55	Humberto A U Sasaki	
56	Isadora T d Almeida	
57	Iuri B d S Bispo	
58	Jaqueline Z d Sousa	
59	João C M Neto	
60	Joao O C Pimenta	
61	Jordi M Soler	2
62	José A N Andrade	
63	José R d Souza	
64	Julia Moretti	
65	Laís Luna	
66	Laís S Vasconcelos	
67	Lariuss Zago	
68	Leonardo A Castelo	
69	Leonardo d A Campos	
70	Letícia C D Silva	
71	Lívia R Bozzo	
72	Lucas B Junho	
73	Lucas d Silva	
74	Lucas H S d Carmo	1
75	Lucas P Cotrim	
76	Luciene Y Y Garcia	
77	Luis A Parra	
78	Luís A R Quadrante	
79	Luiz A S Neto	
80	Luiz E B Minioli	

N	Name	Fc
81	Luiz G d O Appel	
82	Marco A d Medeiros	
83	Marcos S Cueva	
84	Maria E F Chame	
85	Mariana L Pinto	
86	Marina V Craveiro	
87	Mario L Carneiro	
88	Marlon S Mathias	
89	Mauricio D T M Boni	
90	Michel R Miyazaki	
91	Monique E Bruner	
92	Naiade V d Alcântara	
93	Nicole H Hannes	
94	Patricia G Barbosa	
95	Paula S A Michima	
96	Paulo A F Enabe	
97	Paulo R R d Campos	
98	Pedro C d Mello	3
99	Pedro F L Dias	
100	Rafael d A Watai	
101	Rafael Wajnsztajn	
102	Raul Dotta	
103	Ricardo N d Silva	
104	Roberto Romano	
105	Rodolfo T Gonçalves	7
106	Rodrigo D Barrera	
107	Rodrigo M Amarante	
108	Rodrigo S Lavieri	
109	Rosianita Balena	
110	Sergio R G Rossi	
111	Sijia Zheng	
112	Sílvio T d Moraes	
113	Stefano R Paz	
114	Tales R d C B d Souza	
115	Talita d F Alves	
116	Thaís D d Araújo	
117	Thiago B F Boa	
118	Thiago F M Pereira	
119	Thomas H Bizuti	
120	Thomáz M Tessler	
121	Tiago F Moherdaui	
122	Tulio V M Faria	
123	Victor d S Cappelaro	
124	Vinícus L F Matos	

Generation 4

N	Name	Fc
1	Alfonso A Pérez	
2	Andreas Jørgensen	
3	Anneli S Torper	
4	Caio F Faria	
5	Daniela M U Kawaguti	
6	Dorthea V Almklov	
7	Eduardo B d C Silva	
8	Elton F d Magalhães	
9	Giovanni A d Amaral	
10	Guilherme J V Lopes	
11	Heloisa d C Beraldo	
12	Hugo F Gomez	
13	Igor M Lourenço	
14	Julie S Galaaen	
15	Júlio C Alves	
16	Kennedy L d S Neves	
17	Louise d F A Mendes	
18	Markella Lyra	
19	Michel F M d Oliveira	
20	Mohamed S Hasan	
21	Priscila B Soares	
22	Raíza O P Silva	
23	Rodrigo M Carnier	
24	Tatiana Ueno	
25	Thiago Peternella	
26	Vinícius V d Costa	
27	Vitor S F Maciel	
28	Wichuda Munbua	
29	Ynaê A Ferreira	

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ACKNOWLEDGMENTS

We gratefully thank

Prof. Aranha's family and friends

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