Gianfilippo Coppola

Child Study Center, Yale School of Medicine, Yale University, New Haven, CT 06519
gianfilippo.coppola@yale.edu

EDUCATION

PhD, Mechanical Engineering Sept 09
Yale University, New Haven, CT, USA
Thesis title: "Experimental Study of Counterflow Turbulent Diffusion Flames"

MPhil Mechanical Engineering May 04
Yale University, New Haven, CT, USA
Admitted to PhD candidacy in May 2004

MSc Mechanical Engineering May 02
Yale University, New Haven, CT, USA
Received "Honors" marks in six graduate classes

Laurea, Chemical Engineering Dec 99
Universita' di Napoli "Federico II", Napoli, Italy
Thesis title: "3D parallel spectral element solver for non-Newtonian fluids and non-isothermal conditions in complex geometries"
Graduated with 110/110 points.

Visiting Student Jan 98 – Sept 98
Imperial College, London, UK

Free Mover Student Sept 96 – Sept 97
University College London, London, UK

Erasmus Exchange Student Sept 95 – Sept 96
University College London, London, UK

TRAINING

Single Cell Analysis, Cold Spring Harbor Laboratory, NY, USA June 15

EAS Advanced Course in Metabolomics for Clinical Research, VTT Technical Research Center of Finland, Helsinki, Finland Sept 11

Lattice Boltzmann Workshop, University of Oxford, Oxford, UK Sept 11

Large Animal Supplementary Course, Royal Veterinary College, Hawkshead, UK Sept 10

4th European EPIC Programming Course, Aalborg Hospital, Aalborg, Denmark Feb 09

New Licensee Training Course Modules 1 – 4, Imperial College London, London, UK Sept 07

RESEARCH EXPERIENCE

Associate Research Scientist, Yale University, New Haven (CT), USA Oct 11 – present

- Systems biology of neuropsychiatric disorders in post-mortem brain samples and human iPSCs models different stages of cell differentiation.

Visiting Researcher, MRC, Hammersmith Hospital, London, UK Feb 10 – Jan 13

- ChIPseq data analysis methodological development

RA/PostDoc, Imperial College, London, UK Feb 10 – Sept 11

- Numerical, experimental and clinical research on the effect of vessel geometry and blood flow on the development of atherosclerosis and intimal hyperplasia in the human cardiovascular system.

Visiting Researcher, MRC, Hammersmith Hospital, London, UK Aug 10 – Jan 10

- ChIPseq data analysis methodological development

RA/PostDoc, Imperial College, London, UK Sept 06 – July 10

- Numerical, experimental and clinical research on the effect of vessel geometry and blood flow on the development of atherosclerosis and intimal hyperplasia in the human cardiovascular system.

Research Consultant, Veryan Medical, London, UK Oct 06 – Oct 07

- Optimization of geometrical parameters for novel endovascular technology and development of deployment guidelines for the surgeons to optimize outcome.

RA/PhD, Yale University, New Haven, USA Sept 00 – Aug 06

- Development and characterization of a novel turbulence generation scheme. Achieving the highest reported turbulence levels in a counter-flowing configuration. Its application to counter-flow turbulent diffusion flames enhanced the understanding of transient phenomena in the field. It is currently applied to study turbulent premixed flames.

RA, Imperial College, London, UK Jan 00 – Jul 00

- Development and implementation a novel particle-tracking algorithm, which resulted in a threefold increase in speed, when compared to the existing schemes. It is now fully implemented in Nektar and widely used in the group.

Research Consultant, Universita´di Genova, Genova, IT May 97 – Dec 97

- Computational modeling radiation effects in a bio-mass devolatilization model by continuation techniques.

TEACHING EXPERIENCE

TA, Physiological Fluid Mechanics, Imperial College, London, UK 2011
TA, Matlab Programming, Imperial College, London, UK 2010

ACTIVITIES

Member, Engineers Without Borders Sept 05 – to date
Yale University, New Haven, Connecticut

Chair and Founder, TGIF Social Committee Sept 02 – Aug 06
Yale University, Engineering and Applied Science (EN&AS), New Haven, Connecticut

- Founded the Social Committee and served as Chair;
- Organized and coordinated successful social events for EN&AS with up to 80 attendees;
- Obtained $3000 increase on budget ($9000) and successfully extended social activities throughout the summer;
- Doubled students' attendance to social events.

President and co-Founder, "In Vino Veritas" wine club Sept 02 – Aug 06
Yale University, New Haven, Connecticut

- Co-Founded the wine club and served as President
- Organized and coordinated wine and food tasting events

Treasurer, Graduate and Professional Student Senate (GPSS) Sept 03 – May 05
Yale University, New Haven, Connecticut

- Improved communication by presenting monthly financial reports to the GPSS members;
- Worked with Yale financial officers to prepare the GPSS for tax audit;
- Obtained $15000 increase in GPSS budget ($45000);
- Organized and coordinated a ski trip with about 50 attendees;

"The Suspicious", Super Combustor sequel, (http://supercombustor.free.fr/plan.htm**)**
Yale University, New Haven, Connecticut

- Co-directed and acted as "The Suspicious" in Chapter II.

OTHER SKILLS

Languages

- Italian - native speaker
- English - fluent

Computer

- C, C++, F77, F90, MPI, Matlab, R
- Unix, Linux, Windows, EPIC
- Fluent, Ansys, Gambit, TGrid, Nektar, Tecplot, Cantera, Labview
- SolidWorks, ProEngineer, VMTK

Laboratory

- Anesthesia, analgesia, experimental surgery on rodents and large animals
- PIV, Hot wire anemometry, LDV, Rayleigh scattering, PLIF

AWARDS/HONORS

Dept of Bioengineering, Performance Pay – Bonus Payment	Oct 08
Dept of Bioengineering, Performance Pay – Bonus Payment	July 07
Emmanuel H. Gratenstein Fellowship (Yale)	Sept 00 – May 04
Wean Fellowship (Yale)	Sept 00 – May 01
Esso-Exxon Team Prize: best problem analysis and presentation (UCL)	Dec 95
Esso-Exxon Team Prize: second best problem solving skills (UCL)	Dec 95
Erasmus free-mover Fellowship	Sept 96 – Sept 97
Erasmus Fellowship	Sept 95 – Sept 96

PAPERS

- Ardhanareeswaran K., **Coppola G**., Vaccarino F. "The Use of Stem Cells to Study Autism Spectrum Disorder", Yale Journal of Biology and Medicine, 88 (1): 5-16 March 2015
- *Mariani J., ***Coppola G**, Zhang P, Abyzov A, Provini L, Tomasini L, Amenduni M, Szekely A, Palejev D, Wilson M, Gerstein M, Grigorenko E, Chawarska K, Pelphrey K, Howe J, Vaccarino FM, "Dysregulated GABA/glutamate neuron differentiation in autism spectrum disorders with macrocephaly", Cell, *in press* (* equal contribution)
- *Lennington J.B., ***Coppola G.**, Kataoka-Sasaki Y., Fernandez T., Palejev D., Li Y., Huttner A., Pletikos M., Šestan N., Leckman J.F., Vaccarino F.M., "Transcriptome analysis of the human striatum in Tourette syndrome", *Biological Psychiatry*, July 2014, on-line (* equal contribution)
- Caro C.G., Seneviratne A., Heraty K.B., Monaco C., Burke M. G., Krams R., Chang C.C., Guilson P., **Coppola G*.**, "Intimal Hyperplasia Following Implantation of Helical-Centreline and Straight-Centreline Stents in Common Carotid Arteries in Healthy Pigs: Influence of Intraluminal Flow", *Interface J Royal Soc,* 11(92):20131156 Jan 2014 (*lead author)
- Stevens H.E., Mariani J., **Coppola G.**, Vaccarino F., "Neurobiology meets genomic science: the promise of human induced pluripotent stem cells", *Development and Psychopathology* 24(4): 1443-51 Nov 2012
- Mariani J., Simonini M.V., Palejev D., Tomasini L., **Coppola G.**, Szekely A., Horvath T., Vaccarino F., "Modeling Human Cortical Development in vitro using induced Pluripotent Stem Cells", *PNAS* 31(109):12770-12775 Jul 2012
- Frueh J., Maimari N., Lui Y., Kis Z., Falck-Hansen M., Homma T., **Coppola G.**, Krams R., "Systems and Synthetic Biology of the Vessel Wall", *FEBS letters* 15(586):2164-2170 Jul 2012
- Mari JM, Khoo M, Riga C, **Coppola G**, Bicknell C, Caro CG, "Index Proposal and Basic Estimator Study for Quantification of Oscillation of the Secondary Flow Pattern n Tortuous Vessels", *ULTRASONICS* 52(2):294-305 Feb 2012
- **Coppola G**, Gomez A, "Experimental Study of Isothermal Opposed-Jet Flows under Intense Turbulences", *PHYSICS OF FLUIDS* (22): 105101-105101-16 OCT 2010
- **Coppola G**, Gomez A, "Highly Turbulent Counterflow Flames: A Laboratory Scale Benchmark For Practical Systems", *COMBUSTION AND FLAMES* (156):1834-1843 SEP 2009
- ***Coppola G**, Caro CG, "Arterial Geometry, Flow Pattern, Wall Shear and Mass Transport: Potential Physiological Significance", *J R SOC INTERFACE* (6):519-528 JUNE 2009 (* corresponding author)
- **Coppola G**, Caro CG, "Oxygen Mass Transfer in a Model Three-Dimensional Artery", *J R SOC INTERFACE* 26 (5): 1067-1075 SEP 2008

- Ciani A, Kreutner W, Frouzakis CE, Lust K, **Coppola G**, Boulouchos K "An Experimental and Numerical Study of the Structure and Stability of Laminar Opposed-Jet Flows", *COMPUTERS AND FLUIDS* (39): 114-124 JAN 2010
- **Coppola G**, Gomez A, "Experimental Investigation on Turbulence Generation by High Blockage Plates", *EXP THERMAL AND FLUID SC* (33):1037-1048 OCT 2009
- **Coppola G**, Sherwin SJ, Peiro J, "Nonlinear particle tracking for high-order elements ", *J COMPUT PHYS* 172 (1): 356-386 SEP 2001
- Di Felice R, **Coppola G**, Rapagna S, et al., "Modeling of biomass devolatilization in a fluidized bed reactor", *CAN J OF CHEM ENG* 77 (2): 325-332 APR 1999

CONFERENCE CONTRIBUTIONS

- G. G. Altobelli, M. Amenduni, G. Coppola, J. Mariani, A. Amiri, F.M. Vaccarino, "Modeling Human Telencephalic Development Using iPSCs in-vivo and in-vitro: Deleterious Effect of Disrupting Cell-to-Cell Contacts", Neuroscience 2015, 17-21 October, Chicago, IL (USA)
- G. Coppola, K. Ardhanareeswaran, A. Abyzov, J. Mariani, F.M. Vaccarino, "Integrative analysis of gene expression and rare single nucleotide variations in RNAseq data from iPSCs derived 3D telencephalic organoids of ASD patients", Neuroscience 2015, 17-21 October, Chicago, IL (USA)
- J. Leckman, J. B. Lennington, G. Coppola, T. Fernandez, N. Šestan, F. M. Vaccarino, "Transcriptome Analysis of the Human Striatum in Tourette Syndrome", Tourette World Congress 2015, 24-26 June, London (UK)
- M. Amenduni, J. Mariani, G. Coppola, A. Amiri, F. M. Vaccarino, "Modeling human telencephalic development using iPS in vivo and in vitro:deleterious effects of disrupting cell-to cell contact", StemConn 2015, 27 April, Hartford, CT (USA)
- G Coppola, J. B. Lennington, Y. Kataoka-Sasaki, T. Fernandez, D. Palejev, Y. Li, A. Huttner, M. Pletikos, N. Šestan, J. F. Leckman, F. M. Vaccarino, "Integrative analysis of gene expression and rare single nucleotide variations in RNA seq data of the striatum in Tourette syndrome", Neuroscience 2014, 15-19 November, Washington, DC (USA)
- S. Tomasi, G. Coppola, F.M. Vaccarino, "Mechanisms cortical gyrification by FGF-2", Neuroscience 2014, 15-19 November, Washington, DC (USA)
- J. Mariani, G. Coppola, Ping Zhang, J. R. Howe, F. M. Vaccarino, "Dissecting the role of FOXG1 in patients with autism using induced pluripotent stem cells" , Neuroscience 2014, 15-19 November, Washington, DC (USA)
- C.G. Caro, A. Seneviratne, K. B. Heraty, C. Monaco, M. G. Burke, R. Krams, C. C. Chang, P. Gilson, G. Coppola "Helical-Centreline Stent Suppresses Intimal Hyperplasia in Pig Carotid Arteries", 7th World Congress of Biomechanics, 5-11 July '14, Boston, MA (USA)
- S. Tomasi, G. Coppola, B. G. Rash, H. D. Lim, C. Suh, F. M. Vaccarino "FGF2-induced gyrification of the mouse cerebral cortex suggests that the emergence of gyri and sulci is molecularly encoded in the primordial cortical wall", Neuroscience 2013, 8-13 Nov '13, San Diego (USA)
- J. Mariani, G. Coppola, L.E. Provini, L. Tomasini, F.M. Vaccarino "Transcriptome and cellular phenotype of induced pluripotent stem cells derived from patients with autism", Neuroscience 2013, 8-13 Nov '13, San Diego (USA)
- C.Caro, A. Seneviratne, C. Monaco, D. Hou, J. Singh, M. Burke, K. Heraty, R. Krams, G. Coppola "Arterial Stents Intimal Hyperplasia: Role of Hypoxia and Blood-Wall Oxygen Transport", *FCVB 2012*, 30 March-1 April, Imperial College London, London (UK)
- Mariotti E., Caro C., Coppola G. "Does Mass Transport Co-vary with Wall Shear Stress in a Real Geometry?", *Bioengineering'11*, 12-13 Sept '11, Queen Mary, University of London, London (UK)
- Mehta V., Foin N.., Davies J., Krams R., Coppola G. "Towards Studying the Role of Blood Flow in Vulnerable Plaque Formation", *Bioengineering'11*, 12-13 Sept '11, Queen Mary, University of London, London (UK)
- De Luca A., Caro C., Coppola G. "An Intuitive Operator Independent Algorithm for Blood Vessels Segmentation from MRI/CT Images", *Bioengineering'11*, 12-13 Sept '11, Queen Mary, University of London, London (UK)

- Palumbo P., Krams R., Caro C., Coppola G. "Towards an Integrative Nitric Oxide Centric Model of Endothelial Cells Response to External Stimuli", *Bioengineering'11*, 12-13 Sept '11, Queen Mary, University of London, London (UK)
- C.Caro, A. Seneviratne, C. Monaco, D. Hou, J. Singh, M. Burke, K. Heraty, R. Krams, G. Coppola "Arterial Stents Intimal Hyperplasia: Role of Hypoxia and Blood-Wall Oxygen Transport", *Physiology 2011*, 11-14 July, University of Oxford, Oxford (UK)
- De Luca A., Caro C., Coppola G. "Geometric Characterization of the Aortic Bifurcation", *Bioengineering'09*, 24-25 Sept '09, University of Oxford, Oxford (UK)
- Foin N., Poelma C., Mari J.M., Coppola G., Caro C.G., Krams R., "Investigating the Relation Between Secondary Flow and Arterial Disease in a Model of a Human Artery", *Hounsfield Event,* 8 June '09, Imperial College, London (UK)
- Coppola G, Coriton B, Gomez A, "Highly Turbulent Counterflow Flames: A Laboratory Scale Benchmark for Practical Systems", *US National Combustion Meeting, 17-20* May '09, Ann Arbor, MI (USA)
- Coppola G, Coriton B, Gomez A, "Highly Turbulent Counterflow Flames: a Benchmark for Fuel-flexible Practical Systems at Laboratory Scale", *1st International Conference of Energy Engineering (ICEE-1), 29-31* Dec '08, Aswan (EG)
- Coppola G, Caro CG, "The Oxygen Mass Transfer in a Model Three-Dimensional Artery", *Hounsfield Event,* 10 March '08, Imperial College, London (UK)
- Coppola G, Caro CG, "Flow and Mass Transport in Arteries", *16th International Conference on Mechanics in Medicine and Biology,* 23-25 July '08, Pittsburgh, PA (USA)
- Coppola G, Caro CG, "The effect of three-dimensionality of vascular access grafts on the development of pathology", *Cardiovascular Technology Network '07,* Imperial College, London (UK)
- Coppola G, Gomez A, "Highly Turbulent Counterflow Non-premixed Flames", *TNF7,* 3-5 Aug '06, Heidelberg (DE)

BOOK CHAPTERS

- J. B. Lennington, G Coppola,, T. Fernandez. "Genetic insights into Tourette syndrome". In "Movement Disorder Genetics" (pp. NA). New York, NY: Springer (*in press*)

PATENTS

I am co-inventor and sole inventor on various patents related to cardiovascular diseases and technology.
The diagnostic tools are ultrasound based detection techniques of disease prone regions.
The tissue engineering patent describes a novel technology to produce replacement arterial vessels.
The two endovascular technology patents describe novel vascular access devices with enhanced patency rates.

Diagnostic Tools

Co-inventor

- United Kingdom Patent Application Number 0718378.3
- United Kingdom Patent Application Number 0806560.9
- United States Patent Application Number 60/044009

Tissue Engineering

Co- inventor

- International (PCT) Patent Application No. PCT/GB2008/001305

Endovascular Technology

Sole inventor

- United Kingdom Patent Application Number 0822357.0

FELLOWSHIPS

- Helmsley Fellowship, CSHL Single Cell Analysis Course**,** June 15
- EAS Advanced Course in Metabolomics for Clinical Research, Sept 11
- Wellcome Trust VIP Fellowship, "Identification of peaks from ChIP-seq reads across multiple conditions in the rat model system", Aug 10, £22000 ($34000)
- Royal Academy of Engineering International Travel Grant, July 08

GRANTS

Principal Investigator

- NIH/NINDS (R21), "Perfusable brain organoids for long term survival and differentiation", 24 months, Jan 16, $275000 (Under Review)
- CT Stem Cell Research (Seed Grant Awards), "Brain-on-chip", 24 months, July 2015, $200000
- The Brain & Behavior Research Foundation (NARSAD) Young Investigator Grant, "Integrative Regulatory Network Analysis of iPSCs Derived Neuronal Progenitors from Macrocephalic ASD Individuals in a Family-based Design", 24 months, Jan 14, $60000

Key Investigator

- NIH/NIMH (R01), "Gene Regulatory Elements and Transcriptome in IPSCs and Embryonic Human Cortex", 60 months, Jun 14, $650000

Joint Principal Investigator

- Imperial Innovations, "Endovascular Technology Proof of Concept", 4 months, Apr 09, £5800

Co-author/Investigator

- NIH/NIMH (R01), "Genomic Mosaicism in Developing Human Brain", Jan 14, $796000
- Yale Kavli Institute, "Microfluidics System for High Throughput Culture and Analysis of hiPSC", 12 months, Nov 12, $100000
- Imperial Innovations, "Investigation of Stent Design to Minimize Vessel Wall Hypoxia", 9 months, July 2010, £15000
- Wellcome Trust, "Development of phased array detector coils for flow and morphology measurements of the carotid artery using MRI", 6 months, Aug 2009, £24000
- Garfield-Weston Foundation, "Blood Flow and Atherosclerosis in Intimal Hyperplasia", 12 months, June 09, £60000
- General Electrics, "Vascular Geometry and Flow Dynamics: Implications for Vascular Disease", 36 months, Jun 08, £346806
- Garfield-Weston Foundation, "Influence of Local Geometry on Vascular Fluid Mechanics and Mass Transport; Implications for Vascular Disease", 12 months, March 07, £50000
- The Henry Smith Charity, "Imaging and Numerical Studies of 3d Arterial Flow and Mass Transport", 12 months, March 07, £64000