CURRICULUM VITÆ

Prof. Pier-Luc Tremblay
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PERSONAL INFORMATION

Nationality: Canadian
Languages: French and English

CURRENT ACTIVITY

Aug. 2016-present — Professor
Department of Chemical Engineering
School of Chemistry, Chemical Engineering, and Life Science
Wuhan University of Technology (WHUT)
Wuhan, China

RECENT WORK EXPERIENCE

July 2013-July 2016 — Researcher/Assistant Professor
Novo Nordisk Foundation Center for Biosustainability
Technical University of Denmark (DTU)
Kgs Lyngby, Denmark

Sept. 2008-July 2013 — Senior postdoctoral research associate
Principal investigator: Derek Lovley
Department of Microbiology
University of Massachusetts
Amherst, MA, USA

EDUCATION

Sept. 2002- Sept. 2008 — Ph.D., Microbiology
Thesis supervisor: Patrick Hallenbeck
Département de microbiologie/immunologie
Université de Montréal
Montréal, Qc, Canada
Role of AmtB of *Rhodobacter capsulatus* in the posttranslational regulation of Mo-nitrogenase activity and ammonium transport.

Sept. 1999- April 2002 Bachelor of Science in Microbiology (B.Sc.)
Département de microbiologie/biochimie
Université Laval
Québec city, Qc, Canada

RESEARCH ACTIVITIES

Aug. 2016-present **Wuhan University of Technology** (WHUT)
-Development of CO_2-based bioproduction processes such as microbial electrosynthesis and hybrid photosynthesis
-Development of novel biophotocatalytic materials for the conversion of solar energy into H_2, biofuels, or biopolymers
-Study of microbial extracellular electron transfer
-Study of anaerobic hydrocarbons degradation and bioremediation processes
-Study of the metabolism and physiology of dissimilatory metal-reducing bacteria
-Study of the metabolism and physiology of acetogens
-Development of biomaterials and biosensors

July 2013-July 2016 **Technical University of Denmark (DTU)**
-Development of genetic tools for acetogenic bacteria
-Development of production strains for microbial electrosynthesis
-Development of production strains for other C1-based bioproduction processes
-Omics studies with acetogens

Sept.2008-July 2013 **University of Massachusetts**
-Study of extracellular electron transfer by *Geobacter* spp.
-Study of the anaerobic monoaromatic hydrocarbons metabolism of *Geobacter* spp.
-Study of the function of *Geobacter*'s hydrogenases
-Development of genetic tools for *Geobacter* spp. and acetogens
-Study of energy conservation mechanisms in acetogens

Sept. 2002-Aug. 2008 **Université de Montréal**
-Study of the function of the ammonium transporter AmtB in the posttranslational regulation of the molybdenum nitrogenase activity in *R. capsulatus*

TEACHING ACTIVITIES

Sept. 2019-present Advanced Microbiology
Advanced Microbiology Experiment
Aix-Marseille Université College in Wuhan University of Technology
Wuhan, China

Sept. 2020-present Life Science Technology English
Aix-Marseille Université College in Wuhan University of Technology
Wuhan, China

Feb. 2019-present	Bioelectrochemistry Techniques (Winter 2019-2022) School of Chemistry, Chemical Engineering, and Life Science Wuhan University of Technology Wuhan, China
Sept. 2002-May 2008	*General Bacteriology I* (autumn 2002, autumn 2003, autumn 2004) *Microbial Diversity* (autumn 2003, autumn 2004, autumn 2006, autumn 2007) *General Bacteriology II* (winter 2003, winter 2004,winter 2006, winter 2007, winter 2008) Teaching Assistant Université de Montréal Montréal, Qc, Canada

SUPERVISED GRADUATE STUDENTS

2018-present	11 Chemical Engineering M.Sc. students supervised
2014-2017	Nabin Aryal Ph.D. Co-supervisor Novo Nordisk Foundation Center for Biosustainability Technical University of Denmark (DTU) Kgs Lyngby, Denmark
2017-2020	Mengying Xu Ph. D. Co-supervisor Wuhan University of Technology Wuhan, China
2018-2021	Xiao-Chen Shi Ph. D. Co-supervisor Wuhan University of Technology Wuhan, China

RESEARCH GRANT

2021-2025	Development of portable colorimetric sensors for heavy metal ion detection Shaoxing 330 overseas elites Plan, Shaoxing, China 2 million CNY Principal investigator
2021-2022	A genetic system for *Sporomusa ovata* to augment its productivity and versatility as a microbial catalyst for CO_2 bioconversion Research Fellowship for International Young Scientists National Natural Science Foundation of China Grant No. 32050410284 0.3 million CNY Principal investigator

2016-2019	Overseas High-level Talent Introduction Project Wuhan University of Technology 0.3 million CNY Principal investigator
2013-2016	FutureChem, Biosustainable Production of Chemicals from Thin Air. Novo-Nordisk Foundation 2.3 Million DKK Co-principal investigator

EDITOR ACTIVITIES

2019-present	Associate Editor for the specialty section "Microbiotechnology, Ecotoxicology, and Bioremediation" of Frontiers in Bioengineering and Biotechnology (IF: 5.890), Frontiers in Environmental Science (IF: 4.400), and Frontiers in Microbiology (IF: 5.640)
2016-present	Associate Editor for Biotechnology for Biofuels and Bioproducts (IF: 6.040)
2018-2019	Invited co-Editor for a 2nd edition special issue in Frontiers in Microbiology on: "Current challenges and future perspectives on emerging bioelectrochemical technologies"
2014-2015	Invited co-Editor for a special issue in Frontiers in Microbiology on: "Current challenges and future perspectives on emerging bioelectrochemical technologies"

REVIEWER ACTIVITIES

Reviewer for:	Applied and Environmental Microbiology, Biotechnology for Biofuels, PeerJ, Frontiers in Microbiology, Bioelectrochemistry, Journal of Bioscience and Bioengineering, Chemical Communications, Applied Surface Science, Chemical Engineering Journal, iScience, Journal of Materials Chemistry A, The ISME Journal, Environmental Microbiology, Journal of CO_2 Utilization, International Journal of Energy Research,

INTERNATIONAL PEER-REVIEWED JOURNAL ARTICLE

*****First author, [+]First author –equal contribution, [#]Corresponding author

Number of articles: 53
First author: 18
Corresponding author: 26

1) Jiang X., Zhao Z., Liao Y, Tang C., **Tremblay P.-L.**[#], and Zhang T. (2022) A recyclable colorimetric sensor made of waste cotton fabric for the detection of copper ions. Cellulose. 29:5103–5115. **Impact factor:** 6.123

2) Shi X.-C., **Tremblay P.-L.**[+], Xue M., Song X., and Zhang T. (2022) Fumarate disproportionation by *Geobacter sulfurreducens* and its involvement in biocorrosion and interspecies electron transfer. Sci. Total Environ. 827: 154251. **Impact factor:** 10.753

3) Wang J., Xu M., **Tremblay P.-L.**[#]**,** and Zhang T. (2022) Improved polyhydroxybutyrate production by *Cupriavidus necator* and the photocatalyst graphitic carbon nitride from fructose under low light intensity. Int. J. Biol. Macromol. 203:526-534. **Impact factor:** 8.025

4) Jiang L., Peng Y., Xiang T., Liu Y., Xu M., Wang J., **Tremblay P.-L.**[#], and Zhang T. (2022) A counter electrode modified with renewable carbonized biomass for an all-inorganic $CsPbBr_3$ perovskite solar cell. J. Alloys Compd. 902: 163725. **Impact factor:** 6.371

5) Jiang L., Xu M., Jiang S., **Tremblay P.-L.**[#], and Zhang T. (2022) Enhanced hydrogen evolution under visible light by a ternary composite photocatalyst made of CdS and MoS_2 modified with bacterial cellulose aerogel. Cellulose. 29: 175-191. **Impact factor:** 6.123

6) Xu M., Kang Y., Jiang L., Jiang L., **Tremblay P.-L.**[#], and Zhang T. (2022) The one-step hydrothermal synthesis of CdS nanorods modified with carbonized leaves from Japanese raisin trees for photocatalytic hydrogen evolution. Int. J. Hydrog. Energy. 47: 15516-15527. **Impact factor:** 7.139

7) Yang X., Liao M., Zhang H., Gong J., Yang F., Xu, M., **Tremblay P.-L.**[#], and Zhang T. (2021) An electrochemiluminescence resonance energy transfer biosensor for the detection of circulating tumor DNA from blood plasma. iScience. 24103019. **Impact factor:** 6.107

8) Feng Y., Xu M., **Tremblay P-.L.**[#], and Zhang T. (2021) The one-pot synthesis of a ZnSe/ZnS photocatalyst for H_2 evolution and microbial bioproduction. Int. J. Hydrog. Energy. 46: 21901-21911. **Impact factor:** 7.139

9) Shi X-.C., Xiao J., Wang M., Yang X., **Tremblay P-.L.**[#], and Zhang T. (2021) Impact of electron scavenging during electric current generation from propionate by a *Geobacter* co-culture. Chem. Eng. J. 418: 129357. **Impact factor:** 16.744

10) Wang M., **Tremblay P-.L.**[#], and Zhang T. (2021) Optimizing the electrical conductivity of polyacrylonitrile/polyaniline with nickel nanoparticles for the enhanced electrostimulation of Schwann cells proliferation. Bioelectrochemistry. 140: 107750. **Impact factor:** 5.760

11) Ding R., Hu S., Xu M., Hu Q., Jiang S., Xu K., **Tremblay P-.L.**[#], and Zhang T. (2021) The facile and controllable synthesis of a bacterial cellulose/polyhydroxybutyrate composite by co-culturing *Gluconacetobacter xylinus* and *Ralstonia eutropha*. Carbohydr. Polym. 252: 117137. **Impact factor:** 10.723

12) Shi X-.C., **Tremblay P.-L.**[+], Wan L. ,and Zhang T. (2021) Improved robustness of microbial electrosynthesis by adaptation of a strict anaerobic microbial catalyst to molecular oxygen. Sci. Total Environ. 754: 142440. **Impact factor:** 10.753

13) Elmeihy R., Shi X-.C., **Tremblay P-.L.**[#], and Zhang T. (2021) Fast removal of toxic hexavalent chromium from an aqueous solution by high-density *Geobacter sulfurreducens*. Chemosphere. 263: 128281. **Impact factor:** 8.943

14) Xu M., **Tremblay P.-L.**[+], Ding R., Xiao J., Wang J., Kang Y., and Zhang T. (2021) Photo-augmented PHB production from CO_2 or fructose *by Cupriavidus necator* and shape-optimized CdS nanorods. Sci. Total Environ. 753: 142050. **Impact factor**: 10.753

15) Zhang T. and **Tremblay P-.L.**[#]. (2020) Graphene: an antibacterial agent or a promoter of bacterial proliferation? iScience. 23:101787. **Impact factor:** 6.107

16) Hu Q., Xu M., Hu S., **Tremblay P.-L.**[#], and Zhang T. (2020) Selective electrocatalytic reduction of carbon dioxide to formate by a trimetallic Sn-Co/cu foam electrode. J. Electroanal. Chem. 877: 114623. **Impact factor:** 4.598

17) Jiang S., Hu Q., Xu M., Hu S., Shi X.-C., Ding R., **Tremblay P.-L.**[#], and Zhang T. (2020) Crystalline CdS/MoS_2 shape-controlled by a bacterial cellulose scaffold for enhanced photocatalytic hydrogen evolution. Carbohydr. Polym. 250: 116909. **Impact factor:** 10.723

18) Zhang T., Shi X-.C., Ding R., Xu K., and **Tremblay P.-L.**[#] (2020) The hidden chemolithoautotrophic metabolism of *Geobacter sulfurreducens* uncovered by adaptation to formate. ISME J. 14: 2078-2089. **Impact factor:** 11.217

19) Xu M., Jiang L., Wang J., Feng S., **Tremblay P.-L.**[#], and Zhang T. (2020) Efficient photocatalytic hydrogen evolution with high-crystallinity and noble metal-free red phosphorus-CdS nanorods. Int. J. Hydrog. Energy. 45: 17354-17366. **Impact factor:** 7.139

20) Tremblay P-.L.*, Xu M., Chen Y., and Zhang T. (2020) Nonmetallic abiotic-biological hybrid photocatalyst for visible water splitting and carbon dioxide reduction. iScience. 23: 100784. **Impact factor:** 6.107

21) Ueki T., Walker D.J.F., **Tremblay P-.L.**, Nevin K.P., Ward J.E., Woodard T.L., Nonnenmann S., and Lovley D.R. (2019) Decorating the outer surface of microbially produced protein nanowires with peptides. ACS Synth. Biol. 8: 1809-1817. **Impact factor:** 5.249

22) Zhang T., Shi X-.C., Xia Y., Mai L., and **Tremblay P-.L.**[#] (2019) *Escherichia coli* adaptation and response to exposure to heavy atmospheric pollution. Sci. Rep. 9: 10879. **Impact factor:** 4.996

23) Xu M., **Tremblay P-.L.**[+], Jiang L., and Zhang T. (2019) Stimulating bioplastic production with light energy by coupling *Ralstonia eutropha* with the photocatalyst graphitic carbon nitride. Green Chem. 21: 2392-2400. **Impact factor:** 11.034

24) Aryal N., Wan L., Overgaard M.H., Stoot A.C., Chen Y., **Tremblay P-.L.**[#], and Zhang T. (2019) Increased carbon dioxide reduction to acetate in a microbial electrosynthesis reactor with a reduced graphene oxide-coated copper foam composite cathode. Bioelectrochemistry 128: 83-93. **Impact factor:** 5.760

25) Tremblay P-.L.*, Faraghiparapari N. and Zhang T. (2019) Accelerated H_2 Evolution during Microbial Electrosynthesis with *Sporomusa ovata*. Catalysts 9: 166. **Impact factor:** 4.501

26) Aryal N., **Tremblay P-.L.**, Xu M., Daugaard A.E. and Zhang T. (2018) Highly Conductive Poly(3,4-ethylenedioxythiophene) Polystyrene Sulfonate Polymer Coated Cathode for the Microbial Electrosynthesis of Acetate From Carbon Dioxide. Front. Energy Res. 6:72. **Impact factor:** 3.878

27) Zhang T. and **Tremblay P-.L.**[#] (2017) Hybrid photosynthesis-powering biocatalysts with solar energy captured by inorganic devices. Biotechnol. Biofuels 10: 249. **Impact factor:** 7.670

28) Aryal N., Halder A., Zhang M., Whelan P.R., **Tremblay P-.L.**, Chi Q. and Zhang T. (2017) Freestanding and flexible graphene papers as bioelectrochemical cathode for selective and efficient CO_2 conversion. Sci. Rep. 7: 9107. **Impact factor:** 4.996

29) Lehtinen T., Efimova E., **Tremblay P-.L.**, Santala S., Zhang T. and Santala V. (2017) Production of long chain alkyl esters from carbon dioxide and electricity by a two-stage bacterial process. Bioresour. Technol. 243: 30-36. **Impact factor:** 11.889

30) Aryal N., **Tremblay P-.L.**, Lizak D.M. and Zhang T. (2017) Performance of different *Sporomusa* species for the microbial electrosynthesis of acetate from carbon dioxide. Bioresour. Technol. 233: 184-190. **Impact factor:** 11.889

31) Tremblay P-.L.*, Angenent L. and Zhang T. (2017) Extracellular Electron Uptake: Among Autotrophs and Mediated by Surfaces. Trends Biotechnol. 35: 360-371. **Impact factor:** 21.942

32) Aryal N., Halder, A., **Tremblay P-.L**., Chi Q. and Zhang T. (2016) Enhanced microbial electrosynthesis with three-dimensional graphene functionalized cathodes fabricated via solvothermal synthesis. Electrochim. Acta 217: 117-122. **Impact facto**r: 7.336

33) Ammam F., **Tremblay P-.L.**[#], Lizak D.M. and Zhang T. (2016) Effect of tungstate on acetate and ethanol production by the electrosynthetic bacterium *Sporomusa ovata*. Biotechnol. Biofuels 9: 163. **Impact factor:** 7.670

34) Zhang T. and **Tremblay P-.L.** (2016) Editorial: Current challenges and future perspectives on emerging bioelectrochemical technologies. Front. Microbiol. 7: 860. **Impact factor:** 6.064

35) Chen L., **Tremblay P-.L.**[+], Mohanty S., Xu K. and Zhang T. (2016) Electrosynthesis of acetate from CO_2 by a highly structured biofilm assembled with reduced graphene oxide–tetraethylene pentamine. J. Mater. Chem. A 4: 8395-8401. **Impact factor:** 14.511

36) Tremblay P-.L.*, Höglund D., Koza A., Bonde I., and Zhang T. (2015) Adaptation of the autotrophic acetogen *Sporomusa ovata* to methanol accelerates the conversion of CO_2 to organic products. Sci. Rep. 5: 16168. **Impact factor:** 4.996

37) Chaurasia, A.K., **Tremblay, P-.L.**, Holmes D.E., and Zhang T. (2015) Genetic evidence that the degradation of para-Cresol by *Geobacter metallireducens* is catalyzed by the periplasmic *p*-cresol methylhydroxylase. FEMS Microbiol. Lett. 362: fnv145. **Impact factor:** 2.820

38) Tremblay P-.L. * and Zhang T. (2015) Electrifying microbes for the production of chemicals. Front. Microbiol. 6 : 201. **Impact factor:** 6.064

39) Malvankar N.S., Vargas M., Nevin K., **Tremblay P-.L.**, Evans-Lutterodt K., Nykypanchuk D., Martz E., Tuominen M.T. and Lovley D.R. (2015) Structural basis for metallic-Like conductivity in microbial nanowires. mBio 6 (2): e00084-15. **Impact factor:** 7.786

40) Smith J.A., **Tremblay P-.L.**[#], Shrestha P.M., Snoeyenbos-West O.L. Franks A.E., Nevin K.P. and Lovley D.R. (2014). Going wireless: Fe (III) oxide reduction without pili by *Geobacter sulfurreducens* strain JS-1. Appl. Environ. Microbiol. 80 (14): 4331-4340. **Impact factor:** 5.005

41) Zhang T., **Tremblay P-.L.**[+], Chaurasia A.K., Smith J.A., Bain T.S. and Lovley, D.R. (2014) Identification of genes specifically required for the anaerobic metabolism of benzene in *Geobacter metallireducens*. Front. Microbiol. 5:245. **Impact factor:** 6.064

42) Feist A.M., Nagarajan H., Rotaru A.E., **Tremblay P-.L.**, Zhang T., Nevin K.P., Lovley D.R. and Zengler K. (2014).Constraint-based modeling of carbon fixation and the energetics of electron transfer in *Geobacter metallireducens*. PLoS Comput. Biol. 10 (4), e1003575. **Impact factor:** 4.779

43) Liu X., **Tremblay P-.L**., Malvankar N.S., Nevin K.P., Lovley D.R., and Vargas M. (2014) A *Geobacter sulfurreducens* Strain Expressing *Pseudomonas aeruginosa* Type IV Pili Localizes OmcS on Pili but is Deficient in Fe(III) Oxide Reduction and Current Production. Appl. Environ. Microbiol. 80 (3): 1219-1224. **Impact factor:** 5.005

44) Zhang T., **Tremblay P-.L.**, Chaurasia A.K., Smith J.A., Bain T.S. and Lovley, D.R. (2013) Anaerobic benzene oxidation via phenol in *Geobacter metallireducens*. Appl. Environ. Microbiol. 79(24): 7800-7806. **Impact factor:** 5.005

45) Vargas M., Malvankar N.S., **Tremblay P-.L.**, Leang C., Smith J.A., Snoeyenbos-West O., Nevin K.P. and Lovley D.R. (2013) Aromatic-amino acids required for pili conductivity and long-range extracellular electron transport in *Geobacter sulfurreducens.* mBio 4: e00105-13. **Impact factor:** 7.786

46) Smith, J.A., Lovley D.R., and **Tremblay P-.L**.[#] (2013) Outer cell surface components essential for Fe(III) oxide reduction by *Geobacter metallireducens*. Appl. Environ. Microbiol. 79(3) 901-907. **Impact factor:** 5.005

47) Tremblay P-.L.[#]*****, Zhang T., Dar S.A., and Lovley D.R. (2013) The Rnf complex of *Clostridium ljungdahlii* is a proton translocating ferredoxin:NAD^+ oxidoreductase essential for autotrophic growth. mBio 4: e00406-12. **Impact factor:** 7.786

48) Tremblay P-.L.[#]***** and Lovley D.R. (2012) Role of the NiFe hydrogenase Hya in oxidative stress defense in *Geobacter sulfurreducens*. J. Bacteriol. 194(9) 2248-2253. **Impact factor:** 3.476

49) Tremblay P-.L.[#]*****, Aklujkar M., Leang C., Nevin K.P. and Lovley D.R. (2012) A genetic system for *Geobacter metallireducens*: role of the flagellin and pilin in the reduction of Fe(III) oxide. Environ. Microbiol. Rep. 4(1) 82-88. **Impact factor:** 4.006

50) Tremblay P-.L.[#]***,** Summers Z.M., Glaven R.H., Nevin K.P., Zengler K., Barrett C.L., Qiu Y., Palsson, B.O. and Lovley D.R. (2011) A *c*-type cytochrome and a transcriptional regulator responsible for enhanced extracellular electron transfer in *Geobacter sulfurreducens* revealed by adaptive evolution. Environ. Microbiol. 13(1) 13-23. **Impact factor:** 5.476

51) Tremblay, P-.L. * and Hallenbeck P.C. (2009) Of blood, brains and bacteria, the Amt/Rh transporter family: emerging role of Amt as a unique microbial sensor. Mol. Microbiol. 71(1) 12-22. **Impact factor:** 3.979

52) Tremblay, P-.L. * and Hallenbeck P.C. (2008) Ammonia-induced formation of an AmtB-GlnK complex is not sufficient for nitrogenase regulation in the photosynthetic bacterium *Rhodobacter capsulatus*. J. Bacteriol. 190(5) 1588-1594. **Impact factor:** 3.476

53) Tremblay P-.L. *, Drepper T., Masepohl, B. and Hallenbeck P.C. (2007) Membrane sequestration of PII proteins and nitrogenase regulation in the photosynthtic bacterium *Rhodobacter capsulatus*. J.Bacteriol. 189(16) 5850-5859. **Impact factor:** 3.476

BOOK CHAPTER

1) Tremblay P-.L., Li Y., Xu M., Yang X., and Zhang T. (2019) Graphene electrodes in bioelectrochemical systems. *In* Microbial Electrochemical Technology, pp 414-435. Tiquia-Arashiro S., Pant D. (eds) CRC Press.

2) Zhang T., Ghosh D., and **Tremblay P.-L.** (2019) Synthetic biology strategies to improve electron transfer rate at the microbe–anode interface in microbial fuel cells. *In* Bioelectrochemical Interface Engineering, pp 187-208. Krishnaraj R.N., Sani R.K. (eds), Wiley.

3) Zhang T. and **Tremblay P-.L.** (2019) Possible industrial applications for microbial electrosynthesis from carbon dioxide. *In* Microbial Electrochemical Technology, pp 825-842. Venkata Mohan S., Varjani S., Pandey A. (eds), Elsevier.

4) Li Y., **Tremblay P-.L.**, and Zhang T. (2018) Anode catalysts and biocatalysts for microbial fuel cells. *In* Progress and Recent Trends in Microbial Fuel Cells, pp 143-165. Kundu P.P., Dutta K. (eds), Elsevier.

5) Zhang T. and **Tremblay P-.L.** (2018) An adaptive laboratory evolution method to accelerate autotrophic metabolism. *In* Synthetic Metabolic Pathways. Methods in Molecular Biology, vol 1671. Jensen M.K., Keasling J.D. (eds), Humana Press.

6) Tremblay P-.L. and Zhang T. (2017) Functional genomics of metal-reducing microbes degrading hydrocarbons. *In* Anaerobic Utilization of Hydrocarbons, Oils, and Lipids, pp 1-21, Part of the series Handbook of Hydrocarbon and Lipid Microbiology. Boll M. (eds), Springer.

7) Tremblay P-.L., Drepper T., Masepohl B., and Hallenbeck P.C. (2008) Membrane sequestration of PII proteins and nitrogenase regulation in *Rhodobacter capsulatus*. *In* Biological Nitrogen Fixation: Towards Poverty Alleviation through Sustainable Agriculture Current Plant Science and Biotechnology in Agriculture, Springer, Volume 42, III, Part 14, 353-354.

GRANTED INVENTION PATENT

[1] 张甜, 万露露, **皮埃尔鲁克·川柏雷**. 一种利用石墨烯-泡沫铜复合阴极提高生物还原 CO_2 电合成乙酸的方法[P]. 中国发明专利: CN 109371418 B (授权公告号), 2020-01-31.

[2] 张甜, 王马约, **皮埃尔**, 施晓晨. 一种可用于人造神经导管的聚丙烯腈/聚苯胺/镍纳米纤维膜的制备方法[P]. 中国发明专利: CN 110409058 B (授权公告号), 2022-03-04.

[3] 张甜, 许梦莹, **皮埃尔鲁克·川柏雷**, 胡胜军. 一种利用光驱动提高真养产碱杆菌生产 PHB 产量的方法[P]. 中国发明专利: CN 109055445 B (授权公告号), 2022-03-11.

[4] 张甜, 胡胜军, **皮埃尔鲁克·川柏雷**, 许梦莹. 一种简单快速生产 PHB/细菌纤维素复合材料的方法[P]. 中国发明专利: CN 109735593 B (授权公告号), 2022-06-17.

GRANTED COMPUTER SOFTWARE COPYRIGHT REGISTRATION CERTIFICATE

[1] 张甜, 廖雨潇, 蒋向阳, 赵子懿, 黄星龙, 陈天翼, 李思特, **皮埃尔**, 康佳丽, 段佳昊, 唐楚楚. 基于 RGB 原理颜色传感器的铬离子检测系统 V1.0. 计算机软件著作权登记证书 登记号：2021SR1290959, 2021-08-31.

[2] 张甜, 赵子懿, 陈天翼, 李斯特, 廖雨潇, 唐楚楚, 陈宇, 郭浩然, 成思睿, **皮埃尔**. 基于颜色传感器的重金属离子检测系统 V1.0. 计算机软件著作权登记证书 登记号：2022SR0664435, 2022-06-03.