

Palni Kundra, Dr. sc.
In der Lachen 10
CH-8953 Dietikon
Switzerland
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Tel: +41 77 993 58 99

dsm-firmenich
Wurmisweg 576
CH-4303 Kaiseraugst
Switzerland

August 12, 2024

Dear Members of the Hiring Committee,

I am writing with genuine excitement about the Application Scientist (Biotics) position at dsm-firmenich. My doctorate from the Laboratory of Food Biotechnology at ETH Zurich, which focused on the complex interactions between vitamins B9 and B12, human gut microbial communities, and probiotic gut microbes, has put me at the forefront of biotics research. I believe my expertise uniquely qualifies me to drive innovation in your team's groundbreaking work in dietary supplements, medical, and early life nutrition.

My research experience not only fits perfectly with the key responsibilities outlined in the job description but also shows my passion for pushing the boundaries of nutritional science:

1. **Solution development:** My doctoral research explored the effects of dietary and gut-microbially produced vitamins B9 and B12 on complex gut microbiota and individual gut microbes. This work has given me valuable insights for developing cutting-edge solutions in prebiotics, probiotics, and postbiotics. For instance, I discovered how different vitamin B12 forms uniquely affect certain bacteria in the gut, boosting propionate production and potentially improving overall health. I am excited to turn this knowledge into real products that could transform dietary supplements, nutrition, and health.
2. **Prototype development:** During my Ph.D., I gained extensive experience in designing and carrying out complex experimental protocols. My work with batch fermentations to study human gut microbial communities and single gut microbes as well as with their inactivated preparations (postbiotics) showcases my versatility in handling various biotics formats, a skill crucial for innovative product development.
3. **Stability studies and data analysis:** My research required careful attention to detail in setting up and coordinating stability studies for various vitamin forms and doses. I have become proficient in analyzing complex data sets, from metagenomic data to metabolite profiles, using advanced techniques such as HPLC-RI and UHPLC-DAD. For example, I developed a method to measure different vitamin B12 forms produced by gut bacteria using UHPLC-MS/UV. This experience will be valuable in making data-driven decisions in product development and ensuring the stability and effectiveness of biotics formulations.
4. **GMP laboratory maintenance:** My background in food science, combined with thorough laboratory experience at ETH Zurich and industrial internships at Markfed Canneries and Verka Milk plant, has taught me the importance of maintaining high standards and following safety protocols. I am familiar with environmental monitoring practices and careful data recording, which are essential for maintaining GMP standards in biotics production.
5. **Documentation, reporting, and external collaboration:** I have a strong track record in writing detailed scientific reports, preparing research findings for publication, and presenting at international conferences. This demonstrates my ability to communicate complex scientific ideas clearly and effectively. During my

Ph.D., I worked with researchers across different fields and institutions. This experience has improved my ability to work effectively across organizational boundaries and foster a collaborative environment that drives innovation - skills I am keen to bring to your team

My doctoral research has led to several impactful publications that demonstrate my expertise in biotics and nutrition science. These include studies on how different vitamin B12 analogues from gut microbes and diet distinctly impact commensal propionate-producing bacteria in the human gut, enhancing propionate production and potentially improving overall health (*Frontiers in Nutrition*, 2024); how healthy adult gut microbiota can sustain its own vitamin B12 requirement in an in vitro batch fermentation model (*Frontiers in Nutrition*, 2022); and a review exploring the role of dietary micronutrients on gut microbial dysbiosis and modulation in inflammatory bowel disease (*Molecular Nutrition & Food Research*, 2021). Additionally, my recent work (submitted to *BMC Microbiology*, 2024) investigates the effect of microbially-produced vitamin B9 on the growth and metabolism of a butyrate producing beneficial gut bacteria, opening new avenues to produce live biotherapeutics.

While the position requires a master's degree, my Ph.D. in gut microbial biotechnology offers advanced expertise valuable to this role. My educational background - a Bachelor's in Food Science and Technology, a Master's in Food Science, and a doctorate - provides a solid foundation in food science, nutrition, and gut microbiology and biotics, along with strong analytical and critical thinking skills.

Additionally, my language skills, including fluency in English and intermediate German (B1 spoken), will help me communicate effectively in the Swiss work environment and with international colleagues.

I am truly excited about dsm-firmenich's commitment to advancing biotic and nutrition science. I am eager to bring my expertise, dedication, and collaborative spirit to your team, working to develop groundbreaking solutions that positively impact human health across all life stages.

Thank you for considering my application. I am available for interviews on August 19th and 20th and can start immediately. I look forward to the possibility of discussing how I can contribute to dsm-firmenich's continued success and leadership in nutrition science.

Sincerely,

A handwritten signature in black ink, reading "Palni Kundra". The signature is written in a cursive, flowing style with a horizontal line underneath the name.

Palni Kundra

P.S. I would like to mention that I am also applying for the "Pharma & Biological Model Lead" role within dsm-firmenich. My strong interest in both roles comes from my expertise and passion for innovative research in biotics to improve nutrition and health. I believe my skills and experience could be valuable in either position, and I am excited about the prospect of contributing to dsm-firmenich's mission in whichever role best fits the company's needs.

PALNI KUNDRA

Biotechnology, Food Science, Nutrition, Vitamins, Microbiome, Biotics



PERSONAL STATEMENT

Driven by scientific curiosity and a commitment to improving human health through nutrition, I bring my Ph.D. expertise in gut microbial biotechnology from ETH Zurich to the Application Scientist role at dsm-firmenich. My research on vitamin B9 and B12 interactions with gut microbiota has positioned me at the forefront of biotics innovation. With a multidisciplinary background from renowned universities spanning food science, microbiology, and biotechnology, I excel in prototype development, conducting complex biological studies on pre-, pro-, and postbiotics, and translating scientific concepts into clear, actionable insights. I am passionate about developing innovative nutritional solutions that make a real-world impact. I am motivated to collaborate with dsm-firmenich's team to create and deliver next-generation biotic products.



KEY COMPETENCIES

- Possess in-depth knowledge across various scientific disciplines, including food science, microbiology, nutrition, gastroenterology, probiotics, biotechnology and biology.
- Proficient in translating complex scientific concepts into clear, engaging content, as well as translating scientific findings into actionable next steps.
- Proficient in designing, implementing, and executing research projects, encompassing laboratory techniques, statistics and bioinformatics.
- Proven ability to collaborate effectively with internal and external teams.



EDUCATION

- | | | |
|-------------------|--|-----------------------|
| 2018

2023 | ● ETH Zurich
Doctorate (PhD, Dr. sc.)
Supervisor: Prof. Dr. Christophe Lacroix | 📍 Zurich, Switzerland |
| 2016

2018 | ● McGill University
Masters of Science (M.Sc.)
Supervisor: Prof. Jennifer Ronholm
CGPA: 3.87/ 4 | 📍 Montréal, Canada |
| 2011

2015 | ● Guru Nanak Dev University
Bachelor of Food Science and Technology
Advisor: Prof. Bhartendu Singla
CGPA: 8.7/ 10 (<i>Gold medalist</i>) | 📍 Amritsar, India |



WORK AND RESEARCH EXPERIENCE

- | | | |
|---------------------------|---|-----------------------|
| Sep 2018

Jun 2023 | ● Scientific Assistant
ETH Zurich | 📍 Zurich, Switzerland |
|---------------------------|---|-----------------------|
- **Supervisor:** Prof. Dr. Christophe Lacroix
 - Completed a multi-year research project investigating the modulatory potential of dietary and gut-microbially produced vitamin B9 and B12 on the complex gut microbiota, as well as on single next generation probiotic gut microbes.
 - Led the planning and execution of laboratory experiments, developed experimental and analytical methods (UHPLC-UV/MS), and analyzed metagenomic and other data types.
 - Completed project deliverables by preparing research findings for publication in scientific journals.
 - Presented research findings at scientific conferences, effectively communicating complex scientific concepts to diverse audiences.
 - Mentored Bachelor's and Master's students throughout their thesis projects, and facilitated a semester laboratory course, enhancing hands-on learning experiences.



AWARDS AND MEDALS

Gold medal (Bachelor Studies)
University topper 2015

Poster presentation award
Second prize, Green tea ice cream
Presented at science exhibition
2015

COMPUTATIONAL SKILLS

Bioinformatics skills:
metagenomic data analysis
Programming: R, Bash
Version control: git
Project management: GitHub

LANGUAGES

English (Native, C1)
German (Written A2, spoken B1)
Hindi (Native)
Punjabi (Native)

CONTACT INFO

✉ palnikundra@gmail.com
☎ +41 77 993 58 99

MORE INFO

🆔 0000-0002-8999-6451
in [palnikundra](#)
📷 [Palni Kundra](#)
℞ [Palni_Kundra](#)
🌐 [pkundra](#)

May-Sep 2017	Graduate research project McGill University <div> 📍 Montréal, Canada </div> <ul style="list-style-type: none"> • Supervisor: Prof. Jennifer Ronholm • Conducted whole-genome SNP-based analysis to identify changes under laboratory conditions in major foodborne pathogens responsible for global outbreaks. • Provided support for preparing the manuscript for publication.
Jan-Feb 2015	Student research assistant Guru Nanak Dev University <div> 📍 Amritsar, India </div> <ul style="list-style-type: none"> • Supervisor: Prof. Pankaj Gupta • Developed an innovative food product - Green tea ice cream. • Performed sensory and organoleptic evaluation. • Presented the product at scientific conference.
Jul 2014 Mar 2015	Student research assistant Guru Nanak Dev University <div> 📍 Amritsar, India </div> <ul style="list-style-type: none"> • Supervisor: Prof. Bhartendu Singla • Developed various innovative soy-based food products to enhance gluten-free product.
May-Jun 2013	Research internship Indian Council of Agricultural Research <div> 📍 Ludhiana, India </div> <ul style="list-style-type: none"> • Supervisor: Dr. Pranita Jaiswal • Applied a non-destructive quality control approach to develop spectrophotometric method for the detection of Soy-milk adulteration in cow milk. • Performed spectrophotometer analysis.
Jun 2013 & Jul 2014	Industrial internship Markfed Canneries <div> 📍 Jalandhar, India </div> <ul style="list-style-type: none"> • Performed microbiological testing and applied quality control assurance techniques.
Jun-Jul 2013	Industrial internship Verka Milk plant <div> 📍 Jalandhar, India </div> <ul style="list-style-type: none"> • Performed microbiological testing and applied quality control assurance techniques.



SCIENTIFIC PUBLICATIONS

Peer-reviewed Publications

Palni Kundra, Anna Greppi, Monica Duppenhaler, Serafina Plüss, Benoit Pugin, Christophe Lacroix, Annelies Geirnaert. Vitamin B12 analogues from gut microbes and diet differentially impact commensal propionate producers of the human gut. **2024**. *Frontiers in Nutrition*. doi: [10.3389/fnut.2024.1360199](https://doi.org/10.3389/fnut.2024.1360199)


Palni Kundra, Annelies Geirnaert, Benoit Pugin, Paola Morales Martinez, Christophe Lacroix, Anna Greppi. Healthy adult gut microbiota sustains its own vitamin B12 requirement in an in vitro batch fermentation model. **2022**. *Frontiers in Nutrition*. doi: [10.3389/fnut.2022.1070155](https://doi.org/10.3389/fnut.2022.1070155)

Palni Kundra, Carole Rachmühl, Christophe Lacroix, Annelies Geirnaert. Role of dietary micronutrients on gut microbial dysbiosis and modulation in inflammatory bowel disease. **2021**. *Molecular Nutrition & Food Research*. doi: [10.1002/mnfr.201901271](https://doi.org/10.1002/mnfr.201901271)

Nicholas Petronella, **Palni Kundra**, Olivia Auclair, Karine Hébert, Mary Rao, Kyle Kingsley, Katrien De Bruyne, Swapna Banerjee, Alexander Gill, Franco Pagotto, Sandeep Tamber, Jennifer Ronholm. Changes detected in the genome sequences of *Escherichia coli*, *Listeria monocytogenes*, *Vibrio parahaemolyticus*, and *Salmonella enterica* after serial subculturing. **2019**. *Canadian Journal of Microbiology*. doi: [10.1139/cjm-2019-0235](https://doi.org/10.1139/cjm-2019-0235)

Palni Kundra, Annelies Geirnaert, Benoit Pugin, Serafina Plüss, Susanna Kariluoto, Christophe Lacroix, Anna Greppi. Effect of microbially-produced vitamin B9 on the growth and metabolism of human gut microbes. **2024**. submitted to *BMC microbiology*.


THESES

- Jun 2023 • **Doctor of Sciences**
Palni Kundra, 2023. Dr. sc. Thesis. The effect of exogenous and endogenous vitamin B9 and B12 on microbial growth and metabolism in the human gut.  [10.3929/ethz-b-000641198](https://doi.org/10.3929/ethz-b-000641198)
- Jan 2018 • **Master of Science**
Palni Kundra, 2018. M.Sc. Research project. Single Nucleotide Polymorphisms in major food-borne pathogens.





MENTORING

- Master projects at ETH Zurich**
 - Monica Duppenthaler** Vitamin B9 and B12 driven trophic interactions in the human gut. *Master in Food Science*. Jul 2021 - Jan 2022 (Thesis)
 - Janik Mutter** Vitamin B9 production and cross feeding among human gut microbial strains. *Master in Biology*. Mar 2021 - Jul 2021 (Research project)
- Bachelor thesis projects at ETH Zurich**
 - Sabina Galli** B-vitamin bio-factory in the gut: In-vitro vitamin B9 production and utilization by human gut microbes. *Bachelor in Food Science*. Jul 2022 - Oct 2022
 - Sara De Crescenzo** In-vitro Vitamin B12 Production by Human Gut Bacteria. *Bachelor in Food Science*. Jul 2021 - Oct 2021
 - Giuliano Menegon** B-vitamin sharing: In-silico and in-vitro study to determine B9 and B12 cross-feeding between human gut microbial strains. *Bachelor in Food Science*. Jun 2020 - Nov 2020
 - Lucie Kuhn** Give them vitamins: Impact of B9 and B12 on the acetate and butyrate production on human gut microbes. *Bachelor in Food Science*. Nov 2019 - Feb 2020
 - Blandine Genet** Give them vitamins: Impact of B9 and B12 on the butyrate and propionate production on human gut microbes. *Bachelor in Food Science*. Jun 2019 - Sep 2019

TEACHING

- 2019 - 2022 • **752-5004-00L: Food Biotechnology Laboratory Course**
 ETH Zurich  Zurich, Switzerland
 Main responsible for cheese practical (2019 & 2020) and sour dough bread practical (2021 & 2022).
 Semester course

ORAL AND POSTER PRESENTATIONS

- Sep 2021 • **Human Gut Microbial Strains Produce Vitamin B12**
 6th International Vitamin Conference  Denmark
 Oral & Poster
- Jul 2021 • **In-Vitro Vitamin B12 Production by Human Gut Microbial Strains**
 ANAEROBE 2021: THE MICROBIOTA AND BEYOND  Online
 Poster
- Feb 2015 • **Development of soy-based product and their organoleptic evaluation**
 Advances in agricultural Science & biotechnology, *DAV College Jalandhar*  India
 Poster
- Jan 2015 • **"Green tea ice cream"**
 Science exhibition, *DAV College Jalandhar*  India



WORKSHOPS/ COURSES (NOT ON TRANSCRIPTS)

- 2023

● **PMDA Summer School**
 Roche 📍 Basel, Switzerland
 Predictive modelling and data analytics summer school to solve problems in drug discovery and development.
- 2022

● **Project Management for research – for doctoral students**
 ETH Zurich 📍 Zurich, Switzerland
 Project risk management, project management.
- 2021

● **Scientific poster design**
 University of Zurich 📍 Zurich, Switzerland
 content structure, typography do's and don'ts, design principles, design grids, design tools, image editing, perception, color theory.
- 2021

● **Energy and stress management: How to perform in the storm**
 University of Zurich 📍 Zurich, Switzerland
 Energy management, understand obstacles and overcome them, achieve targeted change.
- 2021

● **Time and self management for PhD Candidates**
 ETH Zurich 📍 Zurich, Switzerland
 Assess habits, values, goals, energy, and time management techniques.
- 2021

● **Leadership skills for PhD Candidates**
 University of Zurich 📍 Zurich, Switzerland
 Management, leadership, needs analysis, behavior, destructive leadership, and case studies.
- 2020

● **Statistics for Experimental Research**
 ETH Zurich 📍 Zurich, Switzerland
 Experimental designs, statistical analyses using R, report analyses and results in a scientifically appropriate manner.
- 2018

● **Mass spectrometry-based metabolomics - from theory to practice**
 Functional Genomics Center of University and ETH Zurich 📍 Zurich, Switzerland
 Metabolomics overview, and data analysis and interpretation.
- 2017

● **Introduction to genomic analysis**
 Compute Canada & University of British Columbia 📍 (Online) Canada
 UNIX programming, alignment, Variant calling and annotation, data visualization, and RNA-Seq including statistical analysis.
- 2014

● **36th Post-harvest technology - short course**
 University of California, Davis 📍 Davis, USA
 Advanced Crops handling and harvesting systems.

verleiht

Palni Kundra

Master of Science, McGill University
geboren am 30. November 1991

den Titel

DOKTORIN DER WISSENSCHAFTEN

aufgrund der Doktorarbeit

THE EFFECT OF EXOGENOUS AND ENDOGENOUS VITAMIN B9 AND B12
ON MICROBIAL GROWTH AND METABOLISM IN THE HUMAN GUT

Leiter der Doktorarbeit: Prof. em. Dr. Christophe Lacroix

und der mündlichen Prüfung vom 21. Juni 2023

Zürich, 27. November 2023

Der Rektor



Prof. Dr. Günther Dissertori

Die Vorsteherin des Departements
Gesundheitswissenschaften und Technologie



Prof. Dr. Laura Nyström





McGILL UNIVERSITY
MONTREAL

TO ALL TO WHOM THESE PRESENTS MAY COME, GREETING:
WE, THE GOVERNORS, PRINCIPAL, AND FELLOWS OF MCGILL UNIVERSITY TESTIFY THAT

Palni Kundra

HAVING DILIGENTLY COMPLETED THE REQUIRED COURSE OF STUDY AND PERFORMED
THE PRESCRIBED EXERCISES HAS BEEN ADMITTED TO THE DEGREE OF

MASTER OF SCIENCE

WITH ALL THE HONOURS, PRIVILEGES, AND PREROGATIVES PERTAINING TO THAT DEGREE, IN WITNESS
WHEREOF WE HAVE AFFIXED OUR SIGNATURES AND HAVE CAUSED THE SEAL OF THE UNIVERSITY TO BE
ATTACHED HERETO. GIVEN IN CONVOCATION THIS 6TH DAY OF JUNE IN THE YEAR 2018.

DEAN

REGISTRAR



CHANCELLOR

PRINCIPAL



ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ



ਬੈਚੁਲਰ ਆਫ ਫੂਡ ਸਾਇੰਸ ਐਂਡ ਟੈਕਨੋਲੋਜੀ (ਆਨਰਜ਼)

ਰਜਿਸਟਰਡ ਨੰ : 2011.ਜੇ/ਏ.37

Regd. No. : 2011J/A.37

ਰੋਲ ਨੰ.] 92015036408
Roll No.

ਪ੍ਰਮਾਣਿਤ ਕੀਤਾ ਜਾਂਦਾ ਹੈ ਕਿ ਪਲਨੀ ਕੁੰਦਰਾ ਪੁੱਤਰ/ਪੁੱਤਰੀ ਸ਼੍ਰੀ ਕਿਰਨ ਕਿਸ਼ੋਰ ਕੁੰਦਰਾ
ਅਤੇ ਸ਼੍ਰੀਮਤੀ ਦਿਵਿਆ ਕੁੰਦਰਾ ਨੇ ਡੀ.ਏ.ਵੀ.ਕਾਲਜ, ਜਲੰਧਰ
ਤੋਂ ਨਿਸ਼ਚਿਤ ਕੋਰਸ ਦਾ ਅਧਿਐਨ ਕਰਨ ਉਪਰੰਤ ਅਪ੍ਰੈਲ, 2015 ਵਿਚ ਹੋਈ ਲੋੜੀਂਦੀ ਪ੍ਰੀਖਿਆ ਪਹਿਲੀ (ਵਿਸ਼ੇਸ਼ਤਾ ਸਹਿਤ) ਡਿਵੀਜ਼ਨ ਵਿਚ ਪਾਸ ਕਰਕੇ
ਬੈਚੁਲਰ ਆਫ ਫੂਡ ਸਾਇੰਸ ਐਂਡ ਟੈਕਨੋਲੋਜੀ (ਆਨਰਜ਼) ਦੀ ਡਿਗਰੀ ਪ੍ਰਾਪਤ ਕੀਤੀ ਹੈ।

Guru Nanak Dev University

BACHELOR OF FOOD SCIENCE & TECHNOLOGY (HONOURS)

This is to certify that PALNI KUNDRA son/daughter of Mr. KIRAN KISHORE KUNDRA
and Mrs. DIVYA KUNDRA and of the D. A. V. COLLEGE, JALANDHAR
having pursued the prescribed course of study and passed the requisite Examination, held in APRIL, 2015 has been admitted to the Degree of
BACHELOR OF FOOD SCIENCE & TECHNOLOGY (HONOURS) and been placed in First Division (with Distinction).

ਯੂਨੀਵਰਸਿਟੀ ਸੀਲ ਅਧੀਨ ਪ੍ਰਮਾਣਿਤ ਕੀਤੀ ਗਈ।

Given under the seal of the University.

ਪ੍ਰੋਫੈਸਰ ਇੰਚਾਰਜ (ਪ੍ਰੀਖਿਆਵਾਂ)
Professor Incharge (Exams.)
ਅੰਮ੍ਰਿਤਸਰ] June 17, 2015
Amritsar

ਰਜਿਸਟਰਾਰ
Registrar

ਵਾਈਸ-ਚਾਂਸਲਰ
Vice-Chancellor

ਚਾਂਸਲਰ
Chancellor



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institute of Food, Nutrition and Health
Department of Health Sciences and Technology

ETH Zurich
Prof. Dr. Christophe Lacroix
Head, Laboratory of Food Biotechnology
ETH Zentrum LFV C 20
Schmelzbergstrasse 7
CH-8092 Zürich, Switzerland

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christophe.lacroix@hest.ethz.ch
www.fbt.ethz.ch

Zurich, 20 July 2023 LC

Letter of reference

Palni Kundra, born on November 30, 1991 and a citizen of Indien, was 100.00 % employed by ETH Zurich as doctoral student from September 1, 2018 until June 30, 2023. About 30,000 people from more than 120 countries study, carry out research and work at ETH Zurich.

Ms Palni Kundra's duties and responsibilities in this capacity primarily comprised:

- working on her own thesis in the specialist field of Food Biotechnology on the subject of modulation effects of B-vitamins on the human gut microbiota
- publishing her research results in the form of papers, conference papers, articles for books
- publishing her research results in the form of papers in recognised specialist journals
- presenting papers at academic conferences
- supervising students writing semester papers and/or Master theses
- guiding Bachelor students during exercise and practical sessions
- supervising Master students during practical work in the laboratory/institute/field

Palni Kundra possessed proven expertise and extensive experience in her area of responsibility. She successfully applied herself to new duties and used the acquired knowledge with good results. The effort she put into her work was in proportion to the achieved outcome, and she met the requirements. With her rational and precise approach to her work, she always delivered a good performance. Her good command of languages was of great value for the communication in her work environment.

Palni Kundra showed initiative and complete commitment. Under challenging conditions, she remained calm and assured, adapting to changing circumstances with ease. Perceptive in evaluating the scope and impact of her actions, she was careful when weighing up the related risks and opportunities. In the decision-making process she exercised autonomy blended with a great deal of expertise. When arranging the deployment of staff, she was good at doing so according to need and objective. It was important to her to align her outlook and her actions with the goals of Food Biotechnology.

Letter of reference

Palni Kundra immediately conveyed key information to the relevant recipients, and chose the appropriate moment to involve management when the situation demanded it. In terms of verbal and writing skills, she displayed tremendous adroitness when tailoring her communications to her addressees. Moreover, she was adept at presenting her own ideas in a convincing manner. She took on board other opinions and constructive criticism; she listened to what was said and was tuned in to the needs of her conversational partners. She supported and encouraged collaboration within the team and was highly adept at reconciling differing views. Management, staff and students alike appreciated her greatly and held her in high esteem.

Palni Kundra left us on expiry of her fixed-term employment contract. We thank her for her contribution and wish her every success going forward.



Christophe Lacroix



Cynthia Kumin