Summary 05/01/2017 18:48:27

Profile Name	eSignature	Submitted Date	Payment Type
Patel, Krutik	KRUTIK PATEL	31/12/2016 16:02:00	N/A

Application Form
for postgraduate programmes

University of BRISTOL

AY ref: 3730251

Programme choice:

Programme Geographical Sciences: Physical (PhD)

Second choice not applicable

Faculty Faculty of Science

Start date Sep-17 **Mode of study** Full time (research degree) **Previous UoB student?** N

Applicant contact details :

Family name Patel **Date of birth** 28/09/1994

Given name(s) Krutik

Known as Krutik **Title** Mr

Applicant email address: krutik.patel@student.manchester.ac.uk

Contact address: 15 Milverton Road
Greater Manchester
Manchester

Postcode / ZIP UB6 0NU

Country United Kingdom **Telephone number:** 07961277299

Home address 10 Burwell Avenue
Greenford
London

Postcode / ZIP UB6 0NU

Country United Kingdom Telephone number 07961277299

Agent

Agent email

Personal details

Nationality: British National **Date of entry to UK:** 28/09/1994

Dual nationality: Indian

Country of birth: United Kingdom - England

Country of perm residence: United Kingdom - England **since:** 28/09/1994

Criminal conviction? : N

Do you need a visa to study in the UK? N

Passport number 523991433 **Passport expiry** 04/05/2025

Education

Highest qual on entry: Higher degree of UK institution (Masters)

University or institution name	University of Manchester
Was this programme studied in part or entirely at a UK institution?	Y
Qualification type	MSci (Master in Science)
Qualification description	MSci
Subject	Genetics
Result	1 st (Predicted Result)
Dissertation title (if appropriate)	Discovering novel mRNA enrichments for general Ribonucleotide Binding Proteins
Attended from	09/2013 **to** 06/2017 **Date of award** 06/2017

University or institution name	
Was this programme studied in part or entirely at a UK institution?	Y
Qualification type	A Level
Qualification description	
Subject	Biology
Result	A (Final Result)
Dissertation title (if appropriate)	
Attended from	09/2011 **to** 07/2013 **Date of award** 07/2013

University or institution name	Preston Manor Sixth Form
Was this programme studied in part or entirely at a UK institution?	Y
Qualification type	A Level
Qualification description	
Subject	Chemistry
Result	B (Final Result)
Dissertation title (if appropriate)	B
Attended from	09/2011 **to** 07/2013 **Date of award** 07/2013

University or institution name	Preston Manor Sixth Form
Was this programme studied in part or entirely at a UK institution?	Y
Qualification type	A Level
Qualification description	
Subject	Politics
Result	B (Final Result)
Dissertation title (if appropriate)	
Attended from	09/2011 **to** 07/2013 **Date of award** 07/2013
If you have completed any further study in the UK at any level, whether you completed the course or not, and you required a visa for this study, please indicate this in the free text box	I am in a 4 year MSci course and I have not yet graduated from it. Thus I do not have an official degree certificate to provide at this time.

University of Bristol 2015

Employment

Job title	MSci Student
Employer	University of Manchester
Employer address	Manchester Oxford Road Faculty of Life Science
Postcode / ZIP	M13 9PT
Country	United Kingdom
From	09/2016 **to** 06/2017 ( ) **Current** ☑ **F/T P/T?** Full-time

Job title	Summer Student
Employer	Babraham Institute
Employer address	Cambridge Babraham CB22 3AT
Postcode / ZIP	CB22 3AT
Country	United Kingdom
From	06/2016 **to** 08/2016 **F/T P/T?** Full-time

Job title: Assistant to PhD student

Employer: Royal Veterinary College

Employer address: London

Kings Cross

Postcode / ZIP NW1 0TU

Country United Kingdom

From 07/2012 **to** 08/2012 **F/T P/T?** Full-time

Job title

Employer

Employer address

Postcode / ZIP

Country

From **to** **Current Employer?** ☐ **F/T P/T?**

English Language

English first language? Y **English language of instruction first degree?** Y

Test centre/location

Qualification type **Date of test**

Result **(** **)**

Test number

Details of test still to be taken

Date of test still to be taken

Funding

Fee payment method(s) University of Bristol scholarship, Other (please specify below), I would like to be considered for a funding award from the Department (if one is available)

Further details PhD title: 'The Evolution of Metabolisms that Shaped Life on Earth'.

Scholarship status (if applicable) Secured

Fee-payer details

Research Details

Responding to a studentship advert? Y

Further details Ttitle: PhD in Genomics, Evolution and Computational Phylogenetics: The Evolution of Metabolisms that Shaped Life on Earth

Proposed supervisor(1) Dr. Patricia Sánchez-Baracaldo

Proposed Supervisor(2) Prof. John Huelsenbeck

Proposed research topic(s)

Key words: bioinformatics, botany, environmental science, genetics, evolution.

Aims: Using the bacterial tree of life we hope to find out when and how important proteins and systems involved in metabolism evolved. The important metabolic processes include electron transfer in photo-systems I and II and nitrogen fixation 4,5. We also want to study using large genetic data sets, evolution of bacterial lineages and the evolution of nitrogen fixing and photosynthesis in the bacterial lineages.Furthermore, there will be the opportunity to research horizontal and vertical gene transfer, a common but not-too-well understood method of bacteria gaining new genes.

Specialist units / options

Details of specialist units / options:

Application Information

Already contacted UoB about application? Y

Name and Department of contact Dr. Patricia Sanchez-Baracaldo, Department of Geographical Sciences

Applied previously to UoB for PG study? N

Details

Applying to other UoB programmes? N

Details

Applied to other universities? Y

University of Bath, Wellcome Trust, University of Aberdeen, University of Cambridge.

Details

What influenced decision to apply to UoB? University's reputation, Staff's research interests, Funding opportunity - e.g. Studentship, Content of programme

References

Reference 1

Reference 2

Diversity Information (The information in this section will not affect the academic assessment of your application)

Gender	Male
Disability or long-term health condition	No known disability
Further details	
Ethnicity	Indian - Asian or Asian British
Further details	

Graduates of UK Universities (The information in this section will not affect the academic assessment of your application)

Name of the institution where A-levels (or equivalent qualifications) were taken.	Preston Manor Sixth Form, London
Please provide the amount of time, in years, since you obtained your undergraduate degree.	0
What's the highest qualification level your parents hold?	Not Known / Qualification Not Listed
Do you have any caring responsibilities? E.g. caring for dependent children, or family members with a disability.	N

MANCHESTER 1824
The University of Manchester

Academic Interim Transcript

Student ID: 8987555
1.1 Surname : Patel
1.2 Firstname : Krutik
1.3 Birthdate : 28-09-1994
1.4 HESA ID : 1312041454298

Academic Program History

2.2 Program : BSc (Hons) Genetics with Industrial/Professional Experience
4.1 Mode of Attendance : Full Time
Active in Program : 28-08-2013
2.2 Program : Master of Science Genetics
4.1 Mode of Attendance : Full Time
Program Change : 15-07-2015
End Date : 09-06-2017

Beginning of Undergraduate Record
13/14 Year

BIOL 10221 Molecular Genetics	10.00	83
BIOL 10381 A History of Biology in 20 Objects	10.00	49
BIOL 10401 Introduction to Laboratory Science	10.00	79
BIOL 10511 Biodiversity	10.00	89
BIOL 10521 Genes, Evolution and Development	10.00	81
BIOL 10701 Data Handling Skills 1		
BIOL 10811 Body Systems	10.00	60
BIOL 12011 Level 1 Mini Exams		
BIOL 10000 Academic Tutorials Year 1	10.00	P
BIOL 12000 Health & Safety online course		
BIOL 12020 What is Science for? (Level 1)		
BIOL 10212 Biochemistry	10.00	67
BIOL 10232 From Molecules to Cells	10.00	88
BIOL 10402 Introduction to Experimental Biology	10.00	63
BIOL 10532 Microbes, Man and the Environment	10.00	78
BIOL 10722 Data Handling Skills 2		84
BIOL 10832 Excitable Cells	10.00	69

S.U.S.

Registrar and Secretary

14/15 Year

BIOL 20701	Data Handling Skills 3	
BIOL 21041	Molecular and Cellular Biology EDM	10.00 72
BIOL 21101	Genome Maintenance & Regulation	10.00 77
BIOL 21221	Animal Diversity	10.00 51
BIOL 21371	Organismal Genetics	10.00 55
BIOL 21381	Introduction to Virology	10.00 60
BIOL 21701	Critical Writing Skills (online unit)	
BIOL 22011	Level 2 Mini Exams	
BIOL 20000	Academic Tutorials Year 2	10.00 P
BIOL 21090	Dissertation	10.00 70
BIOL 22020	Science Ethics and Society (Level 2)	
BIOL 20332	Genetics RSM	10.00 73
BIOL 21152	`Omic Technologies & Resources	10.00 74
BIOL 21162	Chemistry of Biomolecules	10.00 60
BIOL 21232	Fundamentals of Evolutionary Biology	10.00 73
BIOL 21242	Immunology	10.00 64

15/16 Year

BIOL 31301	Post-Genome Biology (L)	10.00 56
BIOL 31381	Gene Regulation & Disease (E)	10.00 71
BIOL 31391	Evolution of Genes, Genomes & Systems (E)	10.00 76
BIOL 31751	Stem Cells (L)	10.00 58
BIOL 33001	MSci Research Project Proposal	10.00 65
BIOL 33011	MSci Bioinformatics Tools and Resources	10.00 65
BIOL 30000	Academic Tutorials Year 3	
BIOL 31402	Human Genetics & Evolution (E)	10.00 72
BIOL 31742	Molecular Biology of Cancer (E)	10.00 48
BIOL 33012	MSci Experimental Skills Module	20.00 64
BIOL 40172	Genetics - Essay Paper	10.00 55
BIOL 40372	Genetics - Problem Paper	10.00 79

END OF TRANSCRIPT

Date Produced: 17 November 2016

S.U.S.S.

Registrar and Secretary

Krutik Patel: Cover Letter

My long term career goal is to continue bioinformatic research, prefrably in how imortant biological newtorks and systems evolved. Therefore, the PhD project ‘Genomics, Evolution and Computational Phylogenetics: The Evolution of Metabolism that Shaped Life on Earth’ is the ideal PhD for me. Furthermore, the opportunity to work with Dr. Sanchez-Baracaldo and potentially learn computational techniques from Professor John Huelsenbeck would be a great starting point in starting my career in evolutionary biology. Ontop of this, the project being at the University of Bristol is a massive bonus as it’s one of best Universities for biological sciences in the world.

I am a good candidate for a PhD position at the University of Bristol because this summer I will graduate from the University of Manchester (Msci in Genetics) with over a years experience as a computational biologist. I am confident in my technical ability which I have gathered from my masters project and my summer internship at the Babraham Institute, Cambridge. I would be well suited for a bioinformatic based PhD as I am well versed in programming in R, using the Unix Command Line, python and am experienced in pearl scripting. I also have practical experience in using a range of bioinformatic tools including: Htseq, bowtie, bowtie2, Samtools, Deseq2, EdgeR, SCDE, ggplot2, seqmonk, Gorilla, DAVID and many others. I am also knowledgeable about network evolution and genetics by gaining firsts in most of my molecular biology related modules. Overall, this summer I will graduate with a masters in Genetics from which I have practical computational experience and theoretical knowledge about evolutionary biology. This makes me an unusually well prepared graduate to take on a PhD.

I want todo a PhD in Dr. Sanchez-Baracaldo’s lab as we are both interested in similar biological questions. The topic of when and how important metabolic proteins evolved in cyanobacteria is interesting because this was an integral step in making the planet we live on inhabitable by larger organisms. Furthermore, I like that this project takes an interdiciplinary view on the evolution of life on earth, using phylogenomic, botanic, geological and geochemical data to understand this big question. I can truly picture myself spending 4 years in Bristol researching phylogenetic approaches to how metabolism evolved, and hopefully gain interesting results to publish.

Krutik Patel
3730251

Research Satement

Title

PhD in Genomics, Evolution and Computational Phylogenetics: The Evolution of Metabolisms that Shaped Life on Earth.

Supervisors

Dr. Patricia Sánchez-Baracaldo (University of Bristol)
Prof. John Huelsenbeck (University of California, Berkeley)

Outline of Research

This is a mainly bioinformatic project, where the the bacterial tree of life is used to study how and when fundamental metabolic processes evolved. The metabolic processes in question include electron transfer in photosystems I and II, nitrogen fixation 4,5 and photosynthesis. The project will also involve tracking down the evolution of the metabolic processes in question, in different bacterial lineages using sophisocated phylogenetic software. Another step of the project is to develop new phylogenetic methods to analyse the metabolism which shaped the planet. The final step of the project will be studying lateral and horizontal gene transfer between bacterial species. This project will deepen the understanding of when the metabolic procresses which changed the chemistry, biology and geology of this planet evolved.

Personal Interest

I am interested in the big question this project is asking, which is how and when did the important metabolic processes evolve in cyanobacteria. This question is vital in order to answer why this planet has the ability to hold such an abundant and diverse biodiversity. I am also interested in the bioinformatic methodology used in answering this question. From my masters, courses and summer work I have gotten accustommed to working in a dry lab, whatsmore is, I want to increase my knowledge and expertise in computational biology. In this project we will analyse the genomes of many bacterial species, I hope to learn these computational techniques and also create and implement my own methods as this project continues. Furthermore, Professor John Huelsbeck is co-supervising this project, which icould be a brilliant opportunity for me to learn how to develop my own phylogenetic methods.

Research Training

Undergraduate Masters Project (2016-2017)

The title of my Msci project is ‘finding Novel mRNA binding partners for generic and specific RNA binding proteins). In this project we hope to use an alternative method of normalising RNA-seq based differental expression analysis, this is to challenge the statisticaly mehodology in which contemporary methods of RNA-seq analysis undergoes. So far in this project I’ve learned how to use several bioinformatic tools such as bowtie, samtools, htseq, edgeR and AD normalisation. Furthermore, I have learnt how to code in python and the Unix Command line, and increased my ability in R. From this project I have learned how to do a range of statistical tests including correlation graphs, heatmaps, data subsetting, PCA and MDS plotting. As an Msci student I will spend an entire year with Professor Simon Hubbard and his research group. I have been trained to actively take part in group meetings, journal club, group presentations and how to work in a research lab enviroment.

Undergraduate Taught Courses (2013 - 2016)

I’ve gained firsts in most of my modules which revolve around the subject of molecular biology and molecular evolution. This displays my theoretical knowledge on evolution and metabolism. Furthermore, for 3 consecutive years I’ve have wet lab training, this includes a 2 week long project at the end of my thrd year, in which I and a group of other Msci students had 2 weeks to plan, design and carry out research on BAX/BAK mutants in cell samples.

Babraham Institute (Summer 2016)

Under the supervision of Dr. Nicholas Le Novere, I had a 2 month placement at the babraham institute in Cambdride. My project here aimed to use differential expression techniques to identify different sub populations of human epithelial stem cells. Based on the transcription factors expressed by the cells, the cells were divided into sub populations, and from this I identified other transcription factors and cell surface proteins specific for each sub population. This project taught me how to code in R, use a range of R packages such as Deseq2, ggplot2 and PCA. Furthermore, I learned how to used bioinformatic tools and softaware such as seqmonk, Gorilla and DAVID. My work over the summer will be used to help researchers in the LMB and babraham institute, with further research into epicardial stem cells, thus I should be published later in 2017.

Royal Veterinary College (Summer 2012)

I have always been interested in going into research. Before applying to University, I had a 2 week placement at the Royal Veterinary College in London. Here I shadowed a PhD student and was taught how to perform several wet lab techniques including PCR, gel elecrophoreses, florescent microscopy, histochemistry stainings and I was taught how to read a scientific article.

Krutik Patel

Home Address
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UB6 0NU

Term Time Address
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Manchester
Greater Manchester
M14 5PL

Mobile
07961277299

Email
krutik.patel@student.manchester.ac.uk

Personal Statement

I am an MSci student at the University of Manchester that has experience as a computational biologist from my summer internship in Cambridge and my Masters project. My major biological interest in the Evolution of systems. I also want to add to my knowledge of computational biology, programming and pipeline development as I want to be on the front line of scientific methodology. Ideally I would further my learning by doing a PhD which utilizes computational approaches to investigate the evolution of biological systems.

Education

University of Manchester **(2013-2017)**
MSci (Hons) in Genetics, Masters training **(2016-2017)**
I am currently working in Professor Simon Hubbard's group. The title of my project is 'finding novel mRNA enrichments for general and specific RNA binding proteins'. This project is entirely computational and requires me to learn how to use R the Unix command line, and some python. In this masters I will use a statistical code for normalisation in R to re-analyse the number of interactions between mRNA and generic RBPs such as eIF4E and specific RBPs such as PUF3p. We want to evaluate if this alternative normalisation technique which may provide more interactions, find novel interactions and give fewer false negatives.

This project means I will come out of my degree with a full years worth of experience as a computational scientist. During the MSci course I've so far participated in group meetings, journal clubs, regular meetings with my PI and so I have become familiar with working in a research group. Furthermore I have received additional work including writing project proposals which are similar to grant applications, reading through and assessing grants, academic poster presentations, abstract writing and actively participating in group lab projects which were designed by the students rather than the supervisor. This is the first year the MSci course is running at Manchester, and it is designed to train future researchers.

MSci (Hons) in Genetics, undergraduate training **(2013-2016)**
Averaging an upper 2.1 but in my final year so my results could improve.

Course	%	Course	%	Course	%
Biochemistry	67	Molecular Genetics	83	Molecules to Cells	88
Intro to laboratory	79	Biodiversity	89	Intro to Experimental Biology	63
Data Handling	84	Body Systems	60	Genes, Evolution, Development	81
Excitable Cells	69	Dissertation	70	Microbes, Man, Environment	78
Omics	74	Biomolecules	60	Experimental Design	72
Evolution	73	Immunology	64	Animal Diversity	51
Virology	60	Human Genetics	72	Genes, Regulation, Disease	71
Organismal Genetics	55	Stem Cells	58	Evo of Genes and Systems	76
MSci Project Proposal	65	MSci Bioinformatic	65	MSci Experimental Skills	64
Genetics Essay Paper	55	Genetics Problem	79		

Preston Manor All Through School **(2006-2013)**
A2: Biology (A), Chemistry (B), Government and Politics (B)
AS: Economics (B) 9 GCSEs (4 A's, 4 B's, 1 C), including A in Core Science and A in Additional Science

Work Experience and Volunteering

Summer Intern, Babraham Institute, Cambridge **(June-August 2016)**

- Under Dr. Nicolas Le Novere I learnt a lot about life as a computational biologist. I investigated 360 epicardial stem cells which came out of hi-throughput RNA sequencing. The purpose of this internship was to identify different sub-populations of the epicardial stem cells via specific transcription factors each sub-population had. Then using differential expression methods like Deseq2 and SCDE in R, I found surface proteins specific for the sub-groups, which will be used for future research.
- I have become familiar with programming in R and Linux. I've gained confidence in tackling problems with codes and packages as I've bypassed several outdated packages and programming scripts that did not work immediately. This was a positive experience for me as I had a taste of how life is as a computational biologist, and I may be published next year.

Volunteer, Manchester Outreach Program **(September-November 2014)**

- Completed several hours in preparing food and hot drinks at my Students Union and delivering them to rough sleepers around the city center and university area during evenings, in a team of 3, which was ideal as it did not frighten the rough sleepers, and we could still carry a lot the goods.

Assistant to PhD Student, Royal Veterinary College, London **(August 2012)**

- In order to gain lab experience I took on a summer placement, as the Royal Veterinary College, where I shadowed a PhD student who was researching cancerous tissues of mammary glands, of felines and canines. During this I learnt several techniques including: florescent microscopy, PCR, enzyme staining and histological staining, also some of my work would be included in her reports, and possible even in the final dissertation.
- During this placement I learned about the environment in which a biological research scientist works, which reinforced my decision do work in research and inspired me to aim for post graduate work, such as a PhD.

Skills

Have a UK driver’s License and speak Guajarati and Hindi. I have experience with Linux computers and am confident in using R-studio. Have learnt to use several bioinformatics and statistical packages in R e.g. Deseq2, EdgeR, SCDE, PCA plots and heat plots. Furthermore, I have used several bioinformatics software such as SeqMonk and bioinformatics resources such as Gorilla and DAVID.

Interests

I’ve been a part of socialist students and Manchester labour students and have been directly involved in several protests and demonstrations on and off campus for various reasons. I also enjoy martial arts and it is something I wish to pursue for all my life.

References

Professor Simon Hubbard
Academic Advisor and Masters Supervisor
Faculty of Life Science
University of Manchester
Michael Smith Building
Oxford Road
Manchester
M13 9PT
+44 (0)161 306 8930
simon.hubbard@manchester.ac.uk

Dr. Raymond T. O’Keefe
Personal Advisor
Faculty of Life Sciences
University of Manchester
Michael Smith Building
Oxford Road
Manchester
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+44 (0)161 275 5165
rokeefe@manchester.ac.uk

Krutik Patel
3730251

Research Satement

Title

PhD in Genomics, Evolution and Computational Phylogenetics: The Evolution of Metabolisms that Shaped Life on Earth.

Supervisors

Dr. Patricia Sánchez-Baracaldo (University of Bristol)
Prof. John Huelsenbeck (University of California, Berkeley)

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Applicant Reference
for postgraduate programmes

University of BRISTOL

AY ref:

Referee details

Family name	O'Keefe	**Title**	Dr
Given name(s)	Raymond		
Employer	University of Manchester		
Email address	rokeefe@manchester.ac.uk		
URL			
Contact address	Micheal Smith Building		
	Oxford Road		
Postcode / ZIP	M13 9PT		
Country	United Kingdom	**Telephone number**	+44 (0)161 275 7393

Reference questions

Recommend applicant?	Yes strongly
Referees relationship to applicant	Academic referee
Years referee has known applicant	3.5 years
Capacity in which referee knows applicant	Academic and Personal Tutor

I have known Krutik Patel since September 2013 as a Senior Lecturer at The University of Manchester. During this time I've acted as both his Academic and Personal Tutor. As an Academic Tutor I met on average about 1hr a week with a group of eight Genetics degree students that included Krutik during his First year. In these tutorials I carried out a number of exercises with the students that are designed to complement their lecture units. These exercises included group and individual oral presentations, essay and practical report writing, reading and analysis of research papers as well as data handling and problem solving. This small group teaching provides the perfect opportunity for the academic to observe the abilities of a student and it is within this background that I am able to provide a detailed assessment of the academic abilities and personal attributes of Krutik.

Krutik is a highly motivated student and always strives to do his best. He has an excellent work ethic and would be suited for the rigors of PhD study. Krutik has excellent theoretical knowledge and is predicted to leave Manchester with a First Class degree or upper 2:1 degree. Personally Krutik is a pleasant and hard working student. Krutik can easily form relationships with his peers and academic members of staff. Krutik is reliable and mature. Krutik can easily discuss complex scientific topics with both his peers and academic staff. Krutik is a good public speaker with both his written and spoken English being excellent. I believe Krutik would be able to fit in to any lab situation.

I am unable to comment on the laboratory skills of Krutik as I have not supervised him directly in a laboratory setting. However, all students at Manchester are given extensive practical training during their time here. Specifically, in addition to his practical laboratory courses Krutik is on an MSci course that includes an extended 7 month research project. During this project students must give a scientific talk, a poster presentation, write a scientific abstract, keep a detailed project notebook, participate in journal clubs, participate in lab meetings and complete a final project report in the style of a research paper. Combine this with Krutik's summer research experience at the Babraham Institute I'm confident he has more than ample laboratory skills to carry out PhD research. I would certainly not hesitate to employ Krutik as a PhD student if I had a position on offer and he applied, therefore, I would highly recommend him for any postgraduate programme he applies for.