

## Zichen Gu

Department of Physics, Nanjing University, 210093, Nanjing, China

[zcgu@smail.nju.edu.cn](mailto:zcgu@smail.nju.edu.cn)

### EDUCATION BACKGROUND

09/2014-07/2018(expected)    Department of Physics (Elite program),    Nanjing University, Nanjing, China  
B.S in Physics, Overall Score: 90.8, Official rankings: 5/160 (3%)  
09/2011-06/2014    Beijing 101 Middle School

### RESEARCH INTEREST

Biomaterials, Responsive Materials, Polymer, Nanostructures (experiment)

### AWARDS/HONORS/SCHOLARSHIPS/MEMBERSHIP

11/2016	1 <sup>st</sup> Elite Program Scholarship	8000 CHY	4%
10/2016	National Scholarship Award issued by Ministry of Education of China	8000 CHY	2%
12/2013	3 <sup>rd</sup> Prize of Chinese Chemistry Olympiad (Provincial Competition Area)		
12/2013	3 <sup>rd</sup> Prize of Chinese Physics Olympiad (Provincial Competition Area)		
6/2013	2 <sup>nd</sup> Prize of Chinese High School Biology Olympiad (Provincial Competition Area)		
5/2013	2 <sup>nd</sup> Prize of Chinese middle school applied physics knowledge competition		

### PUBLICATIONS

In preparation :

[1] **Zichen Gu**, Buyun Liang, Xue Bin\*. IPMC material with multilayer Nafion membranes and graphene electrodes (Zichen Gu and Buyun Liang contributed equally to this work)

### RESEARCH EXPERIENCES

➤ Aug. 2016-present Nanjing , China

Group member

Advisor: Dr. Yi Cao

Department of Physical Biology, Nanjing University

#### **Fabrication and electromechanical improvement of IPMC (Ionic Polymer-Metal Composite)**

- Fabricated IPMC with chemical methods : Platinum and Gold Plating over Nafion membrane
- Tested physical properties of IPMC with tension machine and rheometer : The force and strain generated at a certain voltage ; The number of working cycles that the membrane can carry out under sinusoidal alternating voltage
- Bonded several layers of Nafion with Dopa and Sodium periodate to make a thicker multilayer IPMC (2-5mm) : Increase the force produced by it under determinate the voltage
- Produced IPMC with innovative substitute material : Using graphene powder, graphene oxide powder, or single-layer graphene to displace the fragile metal electrodes to decrease the weight of IPMC and improve conductivity of the electrodes.

➤ Mar. 2016-Jul.2016

Nanjing, China

Group member

Advisor: Dr. Yi Cao

Department of Physical Biology, Nanjing University

#### **Measurement of the interaction between gold surface and alkyne with AFM-SMFS (Atomic Force Microscopes - Single Molecule Force Spectroscopy)**

## **ZICHEN GU Curriculum Vitae Updated to 10/3/2017**

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- Used chemical methods to attach long chain alkyne to the AFM tip : Aimed to transfer the force generated by AFM tip to the Au-C bond.
- Verified the interaction between the amorphous gold surface and alkyne with AFM-SMFS : If the interaction existed, there would be additional peaks on the Force spectra.
- Applied the worm chain model to the selection of analyzable force spectrum : The long chain alkyne has entropy elasticity.
- Applied statistical method (e.g. Gauss curve) to fit and calculate the rupture force, dissociation speed, energy barrier of the Au-C bond in different extending speed

➤ Dec. 2015-Feb.2016

Nanjing, China

Group member

Advisor: Dr. Yi Cao

Department of Physical Biology, Nanjing University

### **Synthesis and Testing of the BSA-PEG-Mal hydrogels**

- Synthesized hydrogels with BSA and 4arm-PEG-Mal/PEG-SG : BSA - PEG-SG hydrogels served as control group
- Tested their compressive capacity(Young modulus) using tension machine and viscosity with rheometer
- Tested the self-repairing ability of the BSA – PEG-Mal hydrogels using tension machine and PBS buffer

## **PROJECT EXPERIENCES**

➤ Mar.2015-Jun 2015

Nanjing, China

Group member

Advisor: Ing. Yonghua Pan

Basic Physics Laboratory

### **Measured the attenuation of electromagnetic wave in seawater**

Sponsored by Department of Physics, Nanjing University

- Theoretically calculated the influence of the salinity of seawater on the decay rate of electromagnetic waves in seawater. (Salinity is expressed as sodium chloride concentration)
- Designed the equipment used in measurement of the attenuation of electromagnetic wave with changeable wavelength, salinity, and sand particle density.

## **PROFESSIONAL SKILLS**

Programming Language: Experienced in C, Python

Experimental Skills: Atomic Force Microscope, Scanning Electron Microscope, Rheometer, Tension machine, Rotary evaporator

Computing Software: Igor, Origin, Matlab

Computing Methods: Methods of integration, Runge Kutta method, Monte Carlo methods, Numerical linear algebra

## **STANDARD TESTS**

TOEFL : 104 (Listening: 27, Reading: 30, Speaking: 23, Writing: 24)



# 南京大學 本 科 生 成 績 單

## Undergraduate Academic Transcript Of Nanjing University

No.: 141120033 Name: GU ZI CHEN ID Card No.: 110103199605060016 Gender: Male Date of Birth: May, 1996

Year of Enrollment: Sept, 2014 College: School of Physics Major: Physics Length of Schooling: 4

Course	Credit	Grade	Course	Credit	Grade
<b>2014-2015-1</b>					
10080060A *Listening on English Culture(I)	1.0	80	Degree: -----		
12000620 *History of Physics	2.0	91	Degree Certificate Number: -----		
00010011A Calculus I(Band One)	5.0	91	* is added before optional courses.		
00000020 Cultivation of Ideological Morality and Introduction to Law	3.0	90			
00040010A Physical Education(1)	1.0	90			
12000810 *Basis of Computer Engineering	3.0	90			
12000020 Mechanics	3.0	92			
12000610 *Demonstrative Physics	2.0	97			
00020012A College English	4.0	84			
00000050A Teaching of Situation and Policy (1)	1.0	85			
00050020 Military Skills Practice	1.0	95			
12000010A Experiments in College Physics(I)	3.0	88			
<b>2014-2015-2</b>					
00010011B Calculus II(Band One)	5.0	80			
12000790 *Electrotechnics	2.0	91			
12000010B Experiments in College Physics(II)	2.0	96			
12000040 Electromagnetism	3.0	96			
00310060 The Ethnicity and Border Areas of China in the Twentieth Century	2.0	90			
00020012B College English	4.0	90			
00320080 Evolution of International System	2.0	90			
12000520 *C Language Programming	3.0	92			
00000050B Teaching of Situation and Policy (2)	1.0	99			
00050010 Military Theory and Military Science and Technology	2.0	76			
00040010B Physical Education(2)	1.0	93			
00360030 Aesthetics and Life	2.0	93			
12000030 Thermology	3.0	98			
<b>Overall GPA of Year</b>		<b>4.49</b>			
<b>2015-2016-1</b>					
12000050 Optics	3.0	96			
12000160 Lectures on Frontier Physics	1.0	94			
00321580 War and Peace: Sino-Japanese Relations in Modern and Contemporary Times	2.0	94			
00010011C Linear Algebra (Band One)	4.0	92			
12000060 Modern Physics	3.0	92			
00000040 Chinese Modern History Outline	2.0	97			
12000800 *Data Statistics and Analysis	2.0	86			
00321590 Jewish Civilization between Tradition and Innovation	2.0	95			
00040110A tennis	1.0	93			
<b>2015-2016-2</b>					
12000140 Statistical Physics	3.0	80			
00040100A Badminton(Elementary class)	1.0	96			
12000070 Method of Mathematical Physics	4.0	91			
12000080 Theoretical Mechanics	3.0	90			
12000010C Experiments in College Physics (III)	2.0	92			
00330130 Policy Thinking & Leadership: Comparative Studies of Sino-foreign Think Tanks	2.0	87			
14140032 *General Biology	4.0	95			
12000090 Computational Physics	2.0	93			
<b>Overall GPA of Year</b>		<b>4.58</b>			
<b>2016-2017-1</b>					
37100800 *Nationalism, Three Principles and Communism: Outlines of the 20th cent	2.0	80			
00000010 Basic Principles of Marxism	3.0	96			
12000120 Electrodynamics	3.0	90			
14140013 *Biochemistry	3.0	92			
12000110 Quantum Mechanics	4.0	94			
12001000AI *Computational Photonics I	2.0	99			
<b>Overall GPA of Year</b>		<b>4.61</b>			
Total Credits: 119.00	Overall GPA: 4.54				
Graduation Type: -----					
Graduation Certificate Number: -----					

真伪验证网址(S/N): <http://jwas3.nju.edu.cn:9081/>

验证码(WAP): NJDXFHECCDBADCCHFBVD

教务处盖章

Stamp of Academic Affairs Office

Page 1 of 1

March 4, 2017

school report (front)

南京大学本科学生成绩记载和学分绩计算说明:

1. 所有课程性质分为必修课、选修课两大类。必修课包括通识通修课、平台核心课。
2. 课程考试成绩在60分及以上者,即可取得该门课程的学分。
3. 必修课均采用百分制记分。选修课可采用五级评分制或百分制记分,五级评分制为优、良、中、及格、不及格。
4. 百分制记分、五级评分制记分的换算标准:

百分制	100-90	89-80	79-70	69-60	≤59
五级评分制	优	良	中	及格	不及格

5. 必修课成绩计入平均学分绩,计算方法为:

$$\text{平均学分绩} = \frac{\sum (\text{课程分数} \div 20 \times \text{学分})}{\sum \text{课程学分}}$$

Description of Transcript of Undergraduate Students & GPA Calculation:

- 1.All courses are divided into two categories: compulsory courses and optional courses. Compulsory courses include general students' courses and core courses.
- 2.Credits can be obtained when students' test scores are above 60.
- 3.All compulsory courses are graded according to one-hundred-point system. Optional courses can use two grading systems: one-hundred-point system or five-grade-scoring system. Five grades refer to excellent (A), good (B), average (C), pass (D) and fail (F).
- 4.The one-hundred-point scores are converted into grades as follows:

Scores	100-90	89-80	79-70	69-60	≤59
Grades	Excellent	Good	Average	Pass	Fail

- 5.Compulsory courses' test scores are used to calculate the GPA. The formula is:

$$\text{GPA} = \frac{\sum (\text{Score of the Course} \div 20 \times \text{Credit of the Course})}{\sum \text{the Credits}}$$

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地址: 南京市仙林大道163号 邮编: 210023  
Add: 163 Xianlin Road, Nanjing, China, 210023

电话(传真): +86 25 89683341  
Tel (Fax): +86 25 89683341

school report (reverse)

### 南京大学本科生学分绩排名证明

学号 141120033 姓名 顾子琛 院系 物理学院 专业 物理学类

	第一学年	第二学年	第三学年	第四学年
必修课平均学分绩	4.49	4.58	4.61	/
总平均学分绩	4.54			
所在专业人数	160			
该生排名	5			

院系负责人签字: 王寅龙

日期: 2017.3.8

### Nanjing University Transcript of Student's GPA

Student's Name Zichen Gu Department Physics Major Physics

	The 1st Year	The 2nd Year	The 3rd Year	The 4th Year
GPA of Compulsory Courses	4.49	4.58	4.61	/
GPA of All	4.54			
Num of students	160			
Rankings	5			

Note 1: Elective courses are not included in the compulsory subjects.

Note 2: The formula used to calculate the GPA:

$$\text{GPA} = \frac{\sum (\text{Score of course} \div 20 \times \text{Credit of the course})}{\sum \text{the credit}}$$

Note 3: The grades are converted into scores as follows:

Exempt 90    Excellent 95    Fine 85    Medium 75    Qualified 60

基础学科拔尖学生培养试验计划证明

姓名 顾子琛 学号 141120033 院系 物理学院 专业 物理学

在新招本科学生时，根据新生条件在全年级选择 30 名突出者组成拔尖班重点培养，且每年根据该班学生的学分绩和科研情况滚动淘汰落后者并加入新的优秀者。顾子琛同学（学号：141120033，专业：物理学）以优异表现在拔尖班学习。

特此证明。

院系负责人: 王寅龙

南京大学物理学院

2017 年 3 月 7 日

National Basic Discipline Elite Program

Name: Zichen Gu Department: Physics Major: Physics

National Basic Discipline Elite Program in Physics Department, Nanjing University selects top 30 students in each grade. Every year, according to the GPA and research of each student, the program re-selects qualified students. In this proof, Zichen Gu is selected in National Basic Discipline Elite Program.

Physics Department,

Nanjing University

2017.3.7