

Contents

Part I Choosing Whether or Not to Do a Doctorate

| | | |
|----------|--|----------|
| 1 | Is a Doctorate the Right Course for You? | 3 |
| 1.1 | Overview | 3 |
| 1.2 | Reasons for Doing a Doctorate | 4 |
| 1.2.1 | You Are Planning a Career that Requires a Doctorate Qualification | 4 |
| 1.2.2 | You Are Fascinated by One or More Fields in Engineering or Science | 4 |
| 1.2.3 | You Are Interested in Science, Technology or Mathematics Just for the Sake of It | 5 |
| 1.2.4 | You Want to Prove to Yourself that You Can Achieve the Highest Possible Academic Qualification | 5 |
| 1.3 | A Master's Degree: A Possible Milestone on the Way | 6 |
| 1.4 | Summary | 7 |
| 1.5 | Further Reading | 7 |
| 2 | How Might You Use Your Doctorate, if You Get One? | 9 |
| 2.1 | Overview | 9 |
| 2.2 | Positions that May Require a Doctorate | 9 |
| 2.2.1 | University Employment | 9 |
| 2.2.2 | Private Sector | 10 |
| 2.2.3 | Government Sector | 11 |
| 2.2.4 | A Private Consultant | 11 |
| 2.3 | Skills and Passion | 12 |
| 2.4 | Summary | 13 |
| 2.5 | Further Reading | 13 |

| | | |
|----------|--|-----------|
| 3 | The Where, Who and What of Doing a Doctorate | 15 |
| 3.1 | Overview | 15 |
| 3.2 | Selecting an Institution | 15 |
| 3.2.1 | What to Look for? | 15 |
| 3.2.2 | How to Check These Attributes | 16 |
| 3.3 | Selecting a Supervisor | 18 |
| 3.4 | Selecting a Topic | 20 |
| 3.5 | Summary | 23 |
| 3.6 | Further Reading | 23 |
| 4 | How Hard Will You Have to Work? | 25 |
| 4.1 | Overview | 25 |
| 4.2 | An All Consuming Activity | 25 |
| 4.3 | Things to Avoid | 25 |
| 4.4 | Progress | 26 |
| 4.5 | Impact on Your Family | 27 |
| 4.6 | Summary | 28 |
| 4.7 | Further Reading | 28 |
| 5 | How Long Will It Take You to Get a Doctorate? | 29 |
| 5.1 | Overview | 29 |
| 5.2 | Mission Creep | 29 |
| 5.3 | Be Focused | 30 |
| 5.4 | Goal Setting | 31 |
| 5.5 | Can, and Should, You Do a Doctorate Part-Time? | 32 |
| 5.5.1 | Balancing Work and Thesis | 32 |
| 5.5.2 | Making a Success of a Part-Time Doctorate | 33 |
| 5.6 | Summary | 35 |
| 5.7 | Further Reading | 35 |

Summary of Part I

Part II Doing Your Doctorate

| | | |
|----------|--|-----------|
| 6 | How to Begin | 41 |
| 6.1 | Overview | 41 |
| 6.2 | A Guiding Principle | 41 |
| 6.3 | Hit the Road Running | 41 |
| 6.4 | Keeping Records | 42 |
| 6.5 | Working in a Group | 42 |
| 6.6 | Working with Industry | 43 |
| 6.7 | Summary | 44 |
| 7 | Student–Supervisor Interactions | 47 |
| 7.1 | Overview | 47 |
| 7.2 | Engagement | 47 |

| | | |
|-----------|---|-----------|
| 7.3 | Can I Work with Others as Well as My Supervisor? | 49 |
| 7.4 | Can and Should I Spend Time at Another Institution? | 50 |
| 7.5 | Swapping Topic | 51 |
| 7.6 | Changing Supervisor. | 52 |
| 7.7 | Summary | 53 |
| 7.8 | Further Reading | 54 |
| 8 | The Value of Networking | 55 |
| 8.1 | Overview | 55 |
| 8.2 | Networking with Peers | 55 |
| 8.3 | Other Networks. | 55 |
| 8.4 | Attending Conferences | 56 |
| 8.5 | Joining Professional Associations | 57 |
| 8.6 | Social Media. | 57 |
| 8.7 | Summary | 58 |
| 8.8 | Further Reading | 59 |
| 9 | Tools of the Trade. | 61 |
| 9.1 | Overview | 61 |
| 9.2 | Have Courage and Tenacity | 61 |
| 9.3 | Setting up an Experimental Facility | 62 |
| 9.4 | Keeping Track of the Literature | 62 |
| 9.4.1 | How Much Time Should I Spend Reading the Literature? | 62 |
| 9.4.2 | Keeping Track of References. | 63 |
| 9.5 | Other Tools. | 64 |
| 9.6 | Work-Life Balance | 64 |
| 9.7 | A Long-Term Vision | 65 |
| 9.8 | Summary | 66 |
| 9.9 | Further Reading | 67 |
| 10 | The Art of Publication | 69 |
| 10.1 | Overview | 69 |
| 10.2 | Publications | 69 |
| 10.3 | How Many Papers Should I Write? | 70 |
| 10.3.1 | Conference and Journal Papers | 70 |
| 10.3.2 | Is It Possible that a Book Arises from My Thesis? | 70 |
| 10.4 | Writing a Good Paper. | 71 |
| 10.5 | Peer Review and Resilience | 72 |
| 10.6 | Writing Patents | 74 |
| 10.7 | Summary | 75 |
| 10.8 | Further Reading | 76 |

| | | |
|-----------|---|----|
| 11 | The Art of Making Great Presentations | 77 |
| 11.1 | Overview | 77 |
| 11.2 | Conference Presentations | 77 |
| 11.3 | Three Minutes Is All You Have | 79 |
| 11.4 | Other Ideas | 80 |
| 11.5 | Summary | 80 |
| 11.6 | Further Reading | 81 |
| 12 | The Ethics of Research | 83 |
| 12.1 | Overview | 83 |
| 12.2 | The Context | 83 |
| 12.3 | Humans, Animals and the Environment | 84 |
| 12.4 | Keeping Accurate Records | 84 |
| 12.5 | Accuracy of Publications | 84 |
| 12.6 | Plagiarism | 85 |
| | 12.6.1 Citing the Work of Others | 85 |
| | 12.6.2 Citing Your Own Work | 85 |
| 12.7 | Multiple Submission of Papers | 86 |
| 12.8 | Who Should be an Author of Publications? | 86 |
| 12.9 | Summary | 87 |
| 13 | How to Write Your Thesis | 89 |
| 13.1 | Overview | 89 |
| 13.2 | When to Start Writing | 89 |
| 13.3 | Planning | 90 |
| 13.4 | Reviewing | 90 |
| 13.5 | The Target Length | 91 |
| 13.6 | Be Self-Critical | 91 |
| 13.7 | The Alternative Route of Presenting Papers Only | 91 |
| 13.8 | Summary | 91 |
| 13.9 | Further Reading | 92 |

Summary of Part II

Part III Using Your Doctorate: The Early Years

| | | |
|-----------|-------------------------------------|-----|
| 14 | Securing a Job | 97 |
| 14.1 | Overview | 97 |
| 14.2 | Where to Apply | 97 |
| 14.3 | Selecting an Appropriate Level | 98 |
| 14.4 | Writing Successful Job Applications | 99 |
| 14.5 | Referees | 100 |
| 14.6 | The Job Interview | 100 |
| 14.7 | Summary | 103 |
| 14.8 | Further Reading | 104 |

| | | |
|-----------|--|-----|
| 15 | An Academic Position | 105 |
| 15.1 | Overview | 105 |
| 15.2 | Teaching | 106 |
| 15.2.1 | Prepare Well | 106 |
| 15.2.2 | Good and Bad Teaching | 107 |
| 15.2.3 | Focusing the Content | 108 |
| 15.2.4 | Communicating with Clarity | 108 |
| 15.2.5 | Inspire | 109 |
| 15.2.6 | Learn the Lessons of Failure | 109 |
| 15.3 | Research | 110 |
| 15.3.1 | Good and Bad Research | 111 |
| 15.3.2 | How to Get Started | 111 |
| 15.3.3 | Attracting Research Funding | 112 |
| 15.3.4 | Carrying Out the Research | 113 |
| 15.3.5 | Time Management | 114 |
| 15.3.6 | Reviewing Papers | 114 |
| 15.3.7 | Building Momentum | 115 |
| 15.3.8 | Multidisciplinary Research | 116 |
| 15.3.9 | Making a Quantum Leap Forward | 117 |
| 15.4 | Publication | 119 |
| 15.5 | Administration | 119 |
| 15.6 | Community Engagement | 120 |
| 15.7 | Self-Reliance | 120 |
| 15.8 | Working with Industry | 121 |
| 15.9 | Summary | 122 |
| 15.10 | Further Reading | 123 |
| 16 | A Position in Industry | 125 |
| 16.1 | Overview | 125 |
| 16.2 | A Doctorate in Industry | 125 |
| 16.3 | Having and Delivering on Targets | 126 |
| 16.4 | S.M.A.R.T. Goals | 127 |
| 16.5 | From Administration to Entrepreneurship | 129 |
| 16.5.1 | Administration | 129 |
| 16.5.2 | Project Management | 130 |
| 16.5.3 | Leadership | 130 |
| 16.5.4 | Entrepreneurship | 131 |
| 16.5.5 | An Illustration | 132 |
| 16.6 | Community Engagement | 133 |
| 16.7 | Summary | 133 |
| 16.8 | Further Reading | 134 |
| 17 | Moving Freely Between Academia and Industry | 135 |
| 17.1 | Overview | 135 |
| 17.2 | Moving Freely from Academia to Industry | 135 |

| | | |
|-----------|--|------------|
| 17.3 | Moving Freely from Industry to Academia | 136 |
| 17.4 | A Case Study of a Person Who Successfully Made the Transition in both Directions. | 137 |
| 17.5 | Holding a Joint Appointment Between Academia and Industry | 139 |
| 17.6 | Summary | 139 |
| 18 | The Cycle of Success | 141 |
| 18.1 | Overview | 141 |
| 18.2 | Position Plus Reputation | 142 |
| 18.3 | Skills Plus Resources | 144 |
| | 18.3.1 Making a Spontaneous Pitch | 144 |
| | 18.3.2 Making a Prepared Pitch | 145 |
| | 18.3.3 Attracting the Right People | 147 |
| 18.4 | Leadership | 147 |
| | 18.4.1 Team Development | 148 |
| | 18.4.2 Dealing with Mistakes | 148 |
| | 18.4.3 Mentoring | 149 |
| | 18.4.4 Friends and Enemies | 150 |
| | 18.4.5 Dealing with Rejection | 150 |
| | 18.4.6 Lead by Example Not by Brute Force | 151 |
| 18.5 | Summary | 151 |

Summary of Part III

Part IV Using Your Doctorate: The Later Years

| | | |
|-----------|--|------------|
| 19 | The Cycle of Success: The Later Years | 157 |
| 19.1 | Overview | 157 |
| 19.2 | Position Plus Reputation | 157 |
| 19.3 | Resources Plus Skills | 158 |
| 19.4 | Delivering on Promises | 159 |
| 19.5 | Efficient Conduct of Meetings | 159 |
| 19.6 | Leadership | 160 |
| | 19.6.1 Always Appoint the Very Best People | 160 |
| | 19.6.2 Have Clearly Articulated Goals | 160 |
| | 19.6.3 Believe in What You Are Doing | 161 |
| | 19.6.4 Set Priorities | 161 |
| | 19.6.5 Listen to Others | 162 |
| | 19.6.6 Recognize Your Own Weakness | 162 |
| | 19.6.7 Delegate | 162 |
| | 19.6.8 Understand Teamwork | 163 |
| | 19.6.9 Inspire | 163 |
| 19.7 | Summary of Leadership Qualities | 163 |
| 19.8 | Learning from Other Leaders | 164 |

| | | |
|-----------|---|------------|
| 19.9 | An Example of Great Leadership | 164 |
| 19.10 | Judging Others | 164 |
| 19.11 | Summary | 165 |
| 19.12 | Further Reading | 166 |
| 20 | Public Speaking and Dealing with the Media | 167 |
| 20.1 | Overview | 167 |
| 20.2 | Public Speaking | 167 |
| 20.3 | Dealing with the Media | 169 |
| 20.4 | Summary | 170 |
| 21 | Job and Career Changes | 171 |
| 21.1 | Overview | 171 |
| 21.2 | Embracing Unsolicited Change. | 171 |
| 21.3 | Should You Remain Technically Active or Move into Management?. | 172 |
| 21.4 | Continuity and Leaps into the Unknown. | 173 |
| 21.5 | Summary | 174 |
| 21.6 | Further Reading | 174 |
| 22 | Mentoring and Succession Planning. | 175 |
| 22.1 | Overview | 175 |
| 22.2 | Mentoring. | 175 |
| 22.3 | Succession Planning | 176 |
| 22.4 | Retirement | 177 |
| 22.5 | Summary | 177 |
| 22.6 | Further Reading | 178 |
| 23 | Work-Life Balance | 179 |
| 23.1 | Overview | 179 |
| 23.2 | Reflecting on Work-Life Balance | 179 |
| 23.3 | Reacting Positively to a Forced Time Out | 181 |
| 23.4 | Working Smarter Not Harder | 181 |
| | 23.4.1 Reduce Task Swapping | 182 |
| | 23.4.2 Task Completion | 182 |
| 23.5 | Energy Management. | 183 |
| 23.6 | Delegating. | 184 |
| 23.7 | Summary | 184 |
| 23.8 | Further Reading | 185 |
| 24 | Keeping the Bigger Picture in Focus | 187 |
| 24.1 | Overview | 187 |
| 24.2 | Keeping the Bigger Picture in Focus | 187 |
| 24.3 | Regaining Balance When Injustice Strikes | 189 |
| 24.4 | Broader Life Issues. | 190 |
| 24.5 | Embracing Serendipity | 190 |

| | | |
|------|----------------------------------|-----|
| 24.6 | Our Final Wish for You | 191 |
| 24.7 | Summary | 191 |
| 24.8 | Further Reading | 192 |

Summary of Part IV

A Doctorate and Beyond
Building a Career in Engineering and the Physical
Sciences

Goodwin, G.C.; Graebe, S.F.

2017, XXI, 193 p. 19 illus. in color., Hardcover

ISBN: 978-3-319-45876-2