

An Introduction To Metamaterials And Waves In Composites

An Introduction to Metamaterials and Nanophotonics Metamaterials and Metasurfaces An Introduction to Waves in Mechanical Periodic Structures and Metamaterials Metamaterials with Negative Parameters Metamaterials An Introduction to Metamaterials and Waves in Composites Electromagnetic Metasurfaces Metamaterials in Topological Acoustics Oxford Handbook of Nanoscience and Technology Optical Metamaterials Electromagnetic Metasurfaces Optical Properties of Advanced Materials Advanced Materials and Engineering Materials IV Material and Manufacturing Technology V Metamaterials Advanced Materials Researches, Engineering and Manufacturing Technologies in Industry Materials and Applications for Sensors and Transducers Introduction to Photonic and Phononic Crystals and Metamaterials Nanotechnology-Based Additive Manufacturing Materials, Manufacturing Engineering and Information Technology Constantin Simovski Mohammad Rashed Iqbal Faruque Arnab Banerjee Ricardo Marqués Nader Engheta Biswajit Banerjee Christophe Caloz Sourav Banerjee A. V. Narlikar Wenshan Cai Karim Achouri Yoshinobu Aoyagi Katsuyuki Kida Mei Xing Guo Nader Engheta Hong Hua Tan Evangelos Hristoforou Arthur R. McGurn Kalim Deshmukh B. Xu

An Introduction to Metamaterials and Nanophotonics Metamaterials and Metasurfaces An Introduction to Waves in Mechanical Periodic Structures and Metamaterials Metamaterials with Negative Parameters Metamaterials An Introduction to Metamaterials and Waves in Composites Electromagnetic Metasurfaces Metamaterials in Topological Acoustics Oxford Handbook of Nanoscience and Technology Optical Metamaterials Electromagnetic Metasurfaces Optical Properties of Advanced Materials Advanced Materials and Engineering Materials IV Material and Manufacturing Technology V Metamaterials Advanced Materials Researches, Engineering and Manufacturing Technologies in Industry Materials and Applications for Sensors and Transducers Introduction to Photonic and Phononic Crystals and Metamaterials Nanotechnology-Based Additive Manufacturing Materials, Manufacturing Engineering and Information Technology *Constantin Simovski Mohammad Rashed Iqbal Faruque Arnab Banerjee Ricardo Marqués Nader Engheta Biswajit Banerjee Christophe Caloz Sourav Banerjee A. V. Narlikar Wenshan Cai Karim Achouri Yoshinobu Aoyagi Katsuyuki Kida Mei Xing Guo Nader Engheta Hong Hua Tan Evangelos Hristoforou Arthur R. McGurn Kalim Deshmukh B. Xu*

this book offers a unified presentation of metamaterials building from fundamental nanophotonic principles

metamaterial is an artificially constructed material that interacts differently with light and sound waves than standard natural materials the book gives a comprehensive overview of metamaterials and their properties and the most prevalent structural designs for microwave and terahertz frequencies the authors introduce new coding metamaterial for specific absorption rate sar reduction applications in 5g cellular networks they present conventional metamaterial with unique properties ultra thin wide band and mu negative mng characteristics for terahertz frequency application the authors explore radiation protection spanning fundamental concepts to the latest technologies critically analyze how metamaterials contribute to the enhancement of safety and precision in radiation therapy they cover metamaterial absorbers navigate the domain of coding metamaterials emphasizing their distinctive properties and pivotal role in rcs reduction and emi shielding

metamaterials are artificial engineered materials designed to manipulate wave propagation in ways not possible with conventional materials an introduction to waves in mechanical periodic structures and metamaterials presents a systematic and rigorous treatment of wave propagation in periodic structures with a particular focus on mechanical and acoustic metamaterials this book bridges fundamental concepts and advanced topics offering a unified framework to analyze discrete and continuous periodic systems key topics include comprehensive mathematical formulation of wave propagation in 1d and 2d periodic structures in depth discussion on spectral element formulation transfer matrix method and bandgap formation coverage of advanced concepts such as energy transportation meta damping non reciprocity active control and nonlinear metamaterials unique focus on damping evaluation in metamaterials critical for shock resistance and transient dynamic applications this book serves as an accessible yet rigorous resource for senior undergraduate and graduate students in structural engineering mechanical engineering applied physics and materials science as well as for researchers seeking to deepen their understanding of wave mechanics in metamaterials

the first general textbook to offer a complete overview of metamaterial theory and its microwave applications metamaterials with negative parameters represents the only unified treatment of metamaterials available in one convenient book devoted mainly to metamaterials that can be characterized by a negative effective permittivity and or permeability the book includes a wide overview of the most important topics scientific fundamentals and technical applications of metamaterials chapter coverage includes the electrodynamics of left handed media synthesis of bulk metamaterials synthesis of metamaterials in planar technology microwave applications of metamaterial concepts and advanced and related topics including srr and csrr based admittance surfaces magneto and electro inductive waves and sub diffraction imaging devices a list of problems and references is included at the end of each chapter and a bibliography offers a complete up to daterepresentation of the current state of the art in metamaterials geared toward students and professionals alike metamaterials with negative parameters is an ideal textbook for postgraduate courses and also serves as a valuable introductory reference for scientists and rf microwave engineers

leading experts explore the exotic properties and exciting applications of electromagnetic metamaterials physics and engineering explorations gives readers a clearly written richly illustrated introduction to the most recent research developments in the area of electromagnetic metamaterials it explores the fundamental physics the designs and the engineering aspects and points to a myriad of exciting potential applications the editors acknowledged leaders in the field of metamaterials have invited a group of leading researchers to present both their own findings and the full array of state of the art applications for antennas waveguides devices and components following a brief overview of the history of artificial materials the publication divides its coverage into two major classes of metamaterials the first half of the publication examines effective media with single sng and double negative dng properties the second half examines electromagnetic band gap ebg structures the book further divides each of these classes into their three dimensional 3d volumetric and two dimensional 2d planar or surface realizations examples of each type of metamaterial are presented and their known and anticipated properties are reviewed collectively metamaterials physics and engineering explorations presents a review of recent research advances associated with a highly diverse set of electromagnetic metamaterials its multifaceted approach offers readers a combination of theoretical numerical and experimental perspectives for a better understanding of their behaviors and their potential applications in components devices and systems extensive reference lists provide opportunities to explore individual topics and classes of metamaterials in greater depth with full color illustrations throughout to clarify concepts and help visualize actual results this book provides a dynamic user friendly resource for students engineers physicists and other researchers in the areas of electromagnetic materials microwaves millimeter waves and optics it equips newcomers with a basic understanding of metamaterials and their potential applications advanced researchers will benefit from thought provoking perspectives that will deepen their knowledge and lead them to new areas of investigation

requiring no advanced knowledge of wave propagation an introduction to metamaterials and waves in composites focuses on theoretical aspects of metamaterials periodic composites and layered composites the book gives novices a platform from which they can start exploring the subject in more detail after introducing concepts related to elasticity

discover a comprehensive exploration of recent developments and fundamental concepts in the applications of metasurfaces in electromagnetic metasurfaces theory and applications distinguished researchers and authors karim achouri and christophe caloz deliver an introduction to the fundamentals and applications of metasurfaces and an insightful analysis of recent and future developments in the field the book describes the precursors and history of metasurfaces before continuing on to an exploration of the physical insights that can be gleaned from the material parameters of the metasurface you ll learn how to compute the fields scattered by a metasurface with known material parameters being illuminated by an arbitrary incident field as well as how to realize a practical metasurface and relate its material parameters to its physical structures the authors provide examples to illustrate all the concepts discussed in the book to

improve and simplify reader understanding electromagnetic metasurfaces concludes with an incisive discussion of the likely future directions and research opportunities in the field readers will also benefit from the inclusion of a thorough introduction to metamaterials the concept of metasurfaces and metasurface precursors an exploration of electromagnetic modeling and theory including metasurfaces as zero thickness sheets and bianisotropic susceptibility tensors a practical discussion of susceptibility synthesis including four parameters synthesis more than four parameters synthesis and the addition of susceptibility components a concise treatment of scattered field analysis including approximate analytical methods and finite difference frequency domain techniques perfect for researchers in metamaterial sciences and engineers working with microwave thz and optical technologies electromagnetic metasurfaces theory and applications will also earn a place in the libraries of graduate and undergraduate students in physics and electrical engineering

as an equivalent counterpart of topological research on photonics and condensed matter physics acoustic metamaterials create an opportunity to explore the topological behaviors in phononics and physics of programmable acoustics this book introduces the topological behavior of acoustics through the novel design of metamaterials it provides valuable insight into acoustic metamaterials from multidisciplinary fundamentals to cutting edge research serves as a single resource on acoustic metamaterials covers the fundamentals of classical mechanics quantum mechanics and state of the art condensed matter physics principles so that topological acoustics can be easily understood by engineers introduces topological behaviors with acoustics and elastic waves through quantum analogue hall effects quantum spin hall effects and quantum valley hall effects and their applications explains the pros and cons of different design methods and gives guidelines for selecting specific designs of acoustic metamaterials with specific topological behaviors includes matlab code for numerical analysis of band structures this book is written for graduate students researchers scientists and professionals across materials mechanical civil and aerospace engineering and those who want to enhance their understanding and commence research in metamaterials

this is an agenda setting and high profile book that presents an authoritative and cutting edge analysis of nanoscience and technology the oxford handbook of nanoscience and technology provides a comprehensive and accessible overview of the major achievements in different aspects of this field the handbook comprises 3 volumes structured thematically with 25 chapters each volume i presents fundamental issues of basic physics chemistry biochemistry tribology etc of nanomaterials volume ii focuses on the progress made with host of nanomaterials including dna and protein based nanostructures volume iii highlights engineering and related developments with a focus on frontal application areas all chapters are written by noted international experts in the field the book should be useful for final year undergraduates specializing in the field it should prove indispensable to graduate students and serious researchers from academic and industrial sectors working in the field of nanoscience and technology from different disciplines including physics chemistry biochemistry biotechnology medicine materials science metallurgy ceramics

information technology as well as electrical electronic and computational engineering

metamaterials artificially structured materials with engineered electromagnetic properties have enabled unprecedented flexibility in manipulating electromagnetic waves and producing new functionalities this book details recent advances in the study of optical metamaterials ranging from fundamental aspects to up to date implementations in one unified treatment important recent developments and applications such as superlens and cloaking devices are also treated in detail and made understandable the planned monograph can serve as a very timely book for both newcomers and advanced researchers in this extremely rapid evolving field

discover a comprehensive exploration of recent developments and fundamental concepts in the applications of metasurfaces in electromagnetic metasurfaces theory and applications distinguished researchers and authors karim achouri and christophe caloz deliver an introduction to the fundamentals and applications of metasurfaces and an insightful analysis of recent and future developments in the field the book describes the precursors and history of metasurfaces before continuing on to an exploration of the physical insights that can be gleaned from the material parameters of the metasurface you ll learn how to compute the fields scattered by a metasurface with known material parameters being illuminated by an arbitrary incident field as well as how to realize a practical metasurface and relate its material parameters to its physical structures the authors provide examples to illustrate all the concepts discussed in the book to improve and simplify reader understanding electromagnetic metasurfaces concludes with an incisive discussion of the likely future directions and research opportunities in the field readers will also benefit from the inclusion of a thorough introduction to metamaterials the concept of metasurfaces and metasurface precursors an exploration of electromagnetic modeling and theory including metasurfaces as zero thickness sheets and bianisotropic susceptibility tensors a practical discussion of susceptibility synthesis including four parameters synthesis more than four parameters synthesis and the addition of susceptibility components a concise treatment of scattered field analysis including approximate analytical methods and finite difference frequency domain techniques perfect for researchers in metamaterial sciences and engineers working with microwave thz and optical technologies electromagnetic metasurfaces theory and applications will also earn a place in the libraries of graduate and undergraduate students in physics and electrical engineering

in the last decade optically functionalized materials have developed rapidly from bulk matters to structured forms now we have a rich variety of attractive advanced materials they are applied to optical and electrical devices that support the information communication technology in the mid 21 th century accordingly it is quite important to have a broad knowledge of the optical properties of advanced materials for students scientists and engineers working in optics and related fields this book is designed to teach fundamental optical properties of such advanced materials effectively these materials have their own peculiarities which are very interesting in modern optical physics and also for applications because the concepts of optical properties are quite different from those

in conventional optical materials hence each chapter starts to review the basic concepts of the materials briefly and proceeds to the practical use the important topics covered in this book include quantum structures of semiconductors spintronics photonic crystals surface plasmons in metallic nanostructures photonic metamaterials liquid crystal materials organic led materials and magnet optics

selected peer reviewed papers from the 2014 4th international conference on advanced materials and engineering materials 4th icamem 2014 october 16 17 2014 ningbo china and october 19 20 hong kong china

selected peer reviewed papers from the 5th international conference on material and manufacturing technology icmmt 2014 may 8 9 2014 kuala lumpur malaysia

modern metamaterials is relatively new less than two years old and evolving rapidly it has captured the interest of researchers because theoretically predicted exciting fundamental electromagnetic phenomena can now be realized experimentally and novel devices are feasible this is the critical resource sought by readers who need fundamental knowledge and applications provided by pre eminent experts in this field

selected peer reviewed papers from the 2013 2nd international symposium on materials science and engineering technology ismset 2013 july 27 29 2013 singapore

selected peer reviewed papers from the 1st international conference on materials and applications for sensors and transducers ic mast may 13 17 kos island greece

introduction to photonic and phononic crystals and metamaterials by arthur r mcgurn presents a study of the fundamental properties of optical and acoustic materials which have been of recent interest in nanoscience and device technology the level of the presentations is appropriate for advanced undergraduates beginning graduate students and researchers not directly involved in the field references are given to guide the reader to more advanced study in these fields discussions of the physics of photonic and phononic crystals focus on the transmission properties of optical and acoustic radiation arising from their diffractive interaction in these engineered materials the frequency transmission and non transmission bands of radiation are explained in terms of the symmetry properties of the photonic and phononic artificial crystal structures basic applications of these properties to a variety of their technological applications are examined the physics of metamaterials is discussed along with their relationships to the ideas of resonance properties of negative index of refraction perfect lens and unusual optical effects the new optics of metamaterial media makes available are examined related effects in acoustics are also covered basic principles of surface acoustic and electromagnetic waves are explained these form an introduction to the fundamental ideas of the recently developing fields of plasmonics and surface acoustics

nanotechnology based additive manufacturing state of the art overview of additive manufacturing

techniques with an emphasis on processes product designs and applications this book offers a thorough overview of additive manufacturing technologies including manufacturing requirements product design optimization of processes and product parameters to reduce manufacturing costs it provides a comprehensive and state of the art review on various additive manufacturing technologies their advantages shortcomings potential applications and future directions sample topics discussed by the three well qualified editors on the topic of additive manufacturing include areas of application in the fields of electronics aerospace construction automobile sports and biomedicine material considerations the requirement of specific design fabrication and processing methods advantages and disadvantages of various 3d printing techniques for the respectively intended applications this book is an immensely valuable resource for researchers working in the field of additive manufacturing or 3d printing or for developers dealing with the processing and manufacturing of materials and products for advanced technologies

selected peer reviewed papers from the 2014 2nd international conference on advanced composite materials and manufacturing engineering cmme 2014 march 22 23 2014 wuhan china

Eventually, **An Introduction To Metamaterials And Waves In Composites** will entirely discover a new experience and exploit by spending more cash. nevertheless when? reach you tolerate that you require to get those every needs gone having significantly cash? Why dont you attempt to acquire something basic in the beginning? Thats something that will guide you to comprehend even more **An Introduction To Metamaterials And Waves In Composites** going on for the globe, experience, some places, later history, amusement, and a lot more? It is your extremely **An Introduction To Metamaterials And Waves In Composites** own time tofeat reviewing habit. in the course of guides you could enjoy now is **An Introduction To Metamaterials And Waves In Composites** below.

1. How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice.
2. Are free eBooks of good quality? Yes, many

reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility.

3. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer webbased readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone.
4. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks.
5. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience.
6. An Introduction To Metamaterials And Waves In Composites is one of the best book in our library for free trial. We provide copy of **An Introduction To Metamaterials And Waves In Composites** in digital format, so the resources that you find are reliable. There are also many Ebooks of related with **An Introduction To Metamaterials And Waves In Composites**.
7. Where to download **An Introduction To**

Metamaterials And Waves In Composites online for free? Are you looking for An Introduction To Metamaterials And Waves In Composites PDF? This is definitely going to save you time and cash in something you should think about. If you trying to find then search around for online. Without a doubt there are numerous these available and many of them have the freedom. However without doubt you receive whatever you purchase. An alternate way to get ideas is always to check another An Introduction To Metamaterials And Waves In Composites. This method for see exactly what may be included and adopt these ideas to your book. This site will almost certainly help you save time and effort, money and stress. If you are looking for free books then you really should consider finding to assist you try this.

8. Several of An Introduction To Metamaterials And Waves In Composites are for sale to free while some are payable. If you arent sure if the books you would like to download works with for usage along with your computer, it is possible to download free trials. The free guides make it easy for someone to free access online library for download books to your device. You can get free download on free trial for lots of books categories.

9. Our library is the biggest of these that have literally hundreds of thousands of different products categories represented. You will also see that there are specific sites catered to different product types or categories, brands or niches related with An Introduction To Metamaterials And Waves In Composites. So depending on what exactly you are searching, you will be able to choose e books to suit your own need.

10. Need to access completely for Campbell Biology Seventh Edition book? Access Ebook without any digging. And by having access to our ebook online or by storing it on your computer, you have convenient answers with An Introduction To Metamaterials And Waves In Composites To get started finding An Introduction To Metamaterials And Waves In Composites, you are right to find our website which has a comprehensive collection of books online. Our library is the biggest of these that have literally hundreds of thousands of different

products represented. You will also see that there are specific sites catered to different categories or niches related with An Introduction To Metamaterials And Waves In Composites So depending on what exactly you are searching, you will be able tochoose ebook to suit your own need.

11. Thank you for reading An Introduction To Metamaterials And Waves In Composites. Maybe you have knowledge that, people have search numerous times for their favorite readings like this An Introduction To Metamaterials And Waves In Composites, but end up in harmful downloads.
12. Rather than reading a good book with a cup of coffee in the afternoon, instead they juggled with some harmful bugs inside their laptop.
13. An Introduction To Metamaterials And Waves In Composites is available in our book collection an online access to it is set as public so you can download it instantly. Our digital library spans in multiple locations, allowing you to get the most less latency time to download any of our books like this one. Merely said, An Introduction To Metamaterials And Waves In Composites is universally compatible with any devices to read.

Introduction

The digital age has revolutionized the way we read, making books more accessible than ever. With the rise of ebooks, readers can now carry entire libraries in their pockets. Among the various sources for ebooks, free ebook sites have emerged as a popular choice. These sites offer a treasure trove of knowledge and entertainment without the cost. But what makes these sites so valuable, and where can you find the best ones? Let's dive into the world of free ebook sites.

Benefits of Free Ebook Sites

When it comes to reading, free ebook sites offer numerous advantages.

Cost Savings

First and foremost, they save you money. Buying books can be expensive, especially if you're an avid reader. Free ebook sites allow you to access a vast array of books without spending a dime.

Accessibility

These sites also enhance accessibility. Whether you're at home, on the go, or halfway around the world, you can access your favorite titles anytime, anywhere, provided you have an internet connection.

Variety of Choices

Moreover, the variety of choices available is astounding. From classic literature to contemporary novels, academic texts to children's books, free ebook sites cover all genres and interests.

Top Free Ebook Sites

There are countless free ebook sites, but a few stand out for their quality and range of offerings.

Project Gutenberg

Project Gutenberg is a pioneer in offering free ebooks. With over 60,000 titles, this site provides a wealth of classic literature in the public domain.

Open Library

Open Library aims to have a webpage for every book ever published. It offers millions of free ebooks, making it a fantastic resource for readers.

Google Books

Google Books allows users to search and preview millions of books from libraries and publishers worldwide. While not all books are available for free, many are.

ManyBooks

ManyBooks offers a large selection of free ebooks in various genres. The site is user-friendly and offers books in multiple formats.

BookBoon

BookBoon specializes in free textbooks and business books, making it an excellent resource for students and professionals.

How to Download Ebooks Safely

Downloading ebooks safely is crucial to avoid pirated content and protect your devices.

Avoiding Pirated Content

Stick to reputable sites to ensure you're not downloading pirated content. Pirated ebooks not only harm authors and publishers but can also pose security risks.

Ensuring Device Safety

Always use antivirus software and keep your devices updated to protect against malware that can be hidden in downloaded files.

Legal Considerations

Be aware of the legal considerations when downloading ebooks. Ensure the site has the right to distribute the book and that you're not

violating copyright laws.

Using Free Ebook Sites for Education

Free ebook sites are invaluable for educational purposes.

Academic Resources

Sites like Project Gutenberg and Open Library offer numerous academic resources, including textbooks and scholarly articles.

Learning New Skills

You can also find books on various skills, from cooking to programming, making these sites great for personal development.

Supporting Homeschooling

For homeschooling parents, free ebook sites provide a wealth of educational materials for different grade levels and subjects.

Genres Available on Free Ebook Sites

The diversity of genres available on free ebook sites ensures there's something for everyone.

Fiction

From timeless classics to contemporary bestsellers, the fiction section is brimming with options.

Non-Fiction

Non-fiction enthusiasts can find biographies, self-help books, historical texts, and more.

Textbooks

Students can access textbooks on a wide range of subjects, helping reduce the financial burden of education.

Children's Books

Parents and teachers can find a plethora of children's books, from picture books to young adult novels.

Accessibility Features of Ebook Sites

Ebook sites often come with features that enhance accessibility.

Audiobook Options

Many sites offer audiobooks, which are great for those who prefer listening to reading.

Adjustable Font Sizes

You can adjust the font size to suit your reading comfort, making it easier for those with visual impairments.

Text-to-Speech Capabilities

Text-to-speech features can convert written text into audio, providing an alternative way to enjoy books.

Tips for Maximizing Your Ebook Experience

To make the most out of your ebook reading experience, consider these tips.

Choosing the Right Device

Whether it's a tablet, an e-reader, or a smartphone, choose a device that offers a comfortable reading experience for you.

Organizing Your Ebook Library

Use tools and apps to organize your ebook collection, making it easy to find and access your favorite titles.

Syncing Across Devices

Many ebook platforms allow you to sync your library across multiple devices, so you can pick up right where you left off, no matter which device you're using.

Challenges and Limitations

Despite the benefits, free ebook sites come with challenges and limitations.

Quality and Availability of Titles

Not all books are available for free, and sometimes the quality of the digital copy can be poor.

Digital Rights Management (DRM)

DRM can restrict how you use the ebooks you download, limiting sharing and transferring between devices.

Internet Dependency

Accessing and downloading ebooks requires an internet connection, which can be a limitation in areas with poor connectivity.

Future of Free Ebook Sites

The future looks promising for free ebook sites as technology continues to advance.

Technological Advances

Improvements in technology will likely make accessing and reading ebooks even more seamless and enjoyable.

Expanding Access

Efforts to expand internet access globally will help more people benefit from free ebook sites.

Role in Education

As educational resources become more digitized, free ebook sites will play an increasingly vital role in learning.

Conclusion

In summary, free ebook sites offer an incredible opportunity to access a wide range of books without the financial burden. They are invaluable resources for readers of all ages and interests, providing educational materials, entertainment, and accessibility features. So why not explore these sites and discover the wealth of knowledge they offer?

FAQs

Are free ebook sites legal? Yes, most free ebook sites are legal. They typically offer books that are in the public domain or have the rights to distribute them. How do I know if an ebook site is safe? Stick to well-known and reputable sites like Project Gutenberg, Open Library, and Google Books. Check reviews and ensure the

site has proper security measures. Can I download ebooks to any device? Most free ebook sites offer downloads in multiple formats, making them compatible with various devices like e-readers, tablets, and smartphones. Do free ebook sites offer audiobooks? Many free

ebook sites offer audiobooks, which are perfect for those who prefer listening to their books. How can I support authors if I use free ebook sites? You can support authors by purchasing their books when possible, leaving reviews, and sharing their work with others.

