

IF DNA BE THE BREAD OF LIFE, PLAY ON?

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The analysis in this paper is based upon the hypothetical SING DNA conversion process scenario developed for the AIPLA 26th Mid-Winter Institute, January 22 to 25, 2003. Briefly, Sell Gene InterNational Group (“SING”) has discovered a process for converting human DNA into music. Cecelia Cellout, while serving as the CEO of SING, developed the idea of creating conversion software that would convert individual DNA into music. Cecelia suggested marketing such genetic music to the general public through a website and bulletin board service. Cecelia worked with Igor Inventor, a SING computer programmer, to develop a business plan for receiving DNA gene sequence information and delivering genetic music created from such sequences. Cecelia came up with the ideas, Igor developed the conversion software (“GreenGenes”). After being fired by SING Cecelia met BB Queen (BBQ) in Britain. They subsequently created a version of the conversion software whose end product was more musically complex (“BlueGenes”). Their work was accomplished via faxes and emails between Cecelia in the US and BBQ in Great Britain. On a bet, Elton John provided his DNA to BBQ. The resulting song produced by the BlueGenes program was copyrighted by Elton John and became an immediate hit. Subsequently, Cecelia granted an exclusive license of her rights in the BlueGenes and GreenGenes program to CellGene International Ltd. (“CellGene”). BBQ granted an exclusive license to all her rights to the BlueGenes program to SING. As part of its marketing plan, SING intends to operate a website which posts articles about DNA conversion and offers genetic music for sale. It also intends to operate a bulletin board service where parties may post comments as well as electronically converted DNA sequences.

This paper will focus on the potential copyright issues that might arise under US law in connection with SING’s plans for exploiting its new DNA music conversion process.

Copyright Issues Presented: An Introduction

One of the key questions in analyzing the copyright issues raised by proposed uses by SING of the DNA music conversion process is which country’s laws will apply in determining what rights attach to SING’s activities. It appears that the creation of the DNA conversion software occurred in the United States. It also appears that any copyright claims regarding the use of the BlueGenes software and ownership of any resulting music will similarly be based largely on activities in the United States and will most likely be filed in US courts. Given the primarily US focus of such claims and actions, it is most likely that the legality of SING’s actions will be judged under US copyright laws. It should be noted, however, that the creation of the BlueGenes software might be judged by UK law, particularly since BBQ is a UK resident and at least some

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potentially infringing acts occurred abroad. Copyright ownership of the Elton John song may similarly be decided under UK laws for the same reason. In addition, where actions occur as a result of Internet-based activity, such as in connection with SING's bulletin board and website, jurisdiction may lie outside the United States, with subsequent application of non-US copyright law to determine rights and liabilities. Foreign counsel should be consulted to determine SING's rights and liabilities in all international matters.

Although at its heart the most innovative development may be SING's discovery of a process for converting DNA sequences into music, the process itself falls outside the scope of copyright. Quite simply, US copyright law does not provide protection for ideas or processes.² Even under international law, copyright protection is limited to the protection of expressions and may not be used to protect "ideas, procedures, methods of operation or mathematical concepts as such."³ Thus, SING may not rely upon copyright law to prohibit others from developing methods for converting DNA into music, even if such processes use SING's chosen method of delivery of conversion software. It may, however, rely upon copyright laws to prevent others from creating or using methods of delivery that infringe upon the expressive elements of its conversion software. Given the limitations on the scope of protection provided, SING should not rely solely on copyright law to protect its investment in its new innovation. Copyright, however, can provide useful additional benefits in protection, including assuring protection of elements of the conversion software even if patent protection should prove problematic or non-existent.⁴

Copyright Protection for Computer Software Programs

Copyright protection for computer software programs has long been recognized under both US and international law.⁵ Under US copyright law, protection extends to

² 17 USC § 102(b) ("In no case does copyright protection for an original work of authorship extend to any idea, procedure, *process*, system, method of operation, concept, principle or discovery, regardless of the form in which it is described, explained, illustrated or embodied in such work.") (emphasis added.) See also *Lotus Development Corp. v. Boland International Inc.*, 49 F3d 807 (1st Cir. 1995), *aff'd per curiam*, 516 US 233 (1996) (refusing protection to a command hierarchy for a computer spread sheet program as an unprotectable system of operation).

³ Agreement on Trade-Related Aspects of Intellectual Property Rights, *reprinted in* Doris Estelle Long and Anthony D'Amato, INTERNATIONAL INTELLECTUAL PROPERTY LAW- 2002 DOCUMENT SUPPLEMENT (West 2002), at Article 9(b) (hereinafter "TRIPS"). See also WIPO Copyright Treaty, *reprinted in* Doris Estelle Long and Anthony D'Amato, INTERNATIONAL INTELLECTUAL PROPERTY LAW- 2002 DOCUMENT SUPPLEMENT (West 2002) at Article 2 (employing the identical language as TRIPS, Article 9) (hereinafter "WCCT").

⁴ As the court in *American Dental Association v. Delta Dental Plans Association*, 126 F.2d 977 (7th Cir. 1997), explained: "Einstein's articles laying out the special and general theories of relativity were original works even though many of the core equations such as the famous $E=mc^2$, express "facts" and therefore are not copyrightable. Einstein could have explained relativity in any of a hundred different ways; another could expound the same principles differently." 126 F.3d at 979.

⁵ As early as 1984, US courts in *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 US 1033 (1984) recognized that copyright protection extends to the expressive elements of a computer program. These expressive elements may include screen displays as well as the underlying code. In certain instances courts have also granted protection to the non-literal, non-graphic elements of the program, variously referred to as the structure, sequence and organization of the program. See, e.g., *Whelan Associates Inc. v. Jaslow Dental Laboratory, Inc.*, 797 F.2d 1222 (3d Cir.

“original works of authorship, fixed in any tangible medium of expression now known or later developed from which they can be perceived, reproduced or otherwise communicated.”⁶ To qualify as an “original” work, a work need not be artistic in nature. To the contrary, copyright protection has been granted to largely utilitarian and functional objects, including maps, charts and databases.⁷ Thus, the fact that the GreenGenes conversion software has been created to serve a largely functional purpose -- to convert DNA into music -- does not itself prevent copyright protection. US courts have long recognized that computer software programs may qualify for copyright protection despite their largely functional nature.⁸ Even international law recognizes that computer software programs may be protected under copyright law.⁹ The critical issue in deciding coverage, however, is the extent to which the software program itself contains *original expression*.¹⁰

Under its seminal decision *Feist Publications Inc. v. Rural Telephone Service Co.*,¹¹ the United States Supreme Court established that only those works which are “original” in the sense that they contain a modicum of creativity may be protected under US copyright law.¹² Works which merely represent a substantial investment in time, money or labor -- what has often been referred to as “sweat of the brow” -- do not qualify. To possess the necessary modicum of creativity, SING must prove “the existence of ... intellectual production, of thought, and conception.”¹³ This modicum of creativity requirement has been broadly interpreted in connection with computer software protection in the United States. Where a work is created as a result of the exercise of judgment or choice, and not merely mechanical or functional needs, copyright protection is available. Thus, for example, in *Superchips Inc. v. Street Performance Electronics Inc.*¹⁴ changing numerical values in Ford’s factory computer codes for the purpose of achieving optimum automotive engine performance met US originality standards. Despite the functional goals of such changes, they were not “so mechanical or routine as

1986), *cert. denied*, 479 US 1031 (1987)(copyright protection extends to computer programs structure, sequence and organization).

⁶ 17 USC § 102(definition of copyright protectable work).

⁷ See, e.g., *Amsterdam v. Triangle Publications, Inc.*, 189 F.2d 104 (3d Cir. 1951)(maps); *New York Times Co. v. Roxbury Data Interface, Inc.*, 434 F. Supp 217 (D.N.J. 1977)(indexes); *Kregos v. Associated Press*, 937 F.2d 700 (2d Cir. 1991)(form for compiling statistics for baseball pitchers).

⁸ See, e.g., *Apple Computer, Inc.*, 714 F.2d 1240. See also 17 USC § 117 (granting the owner of a copy of a computer program the right to make or authorize adaptations where any such adaptation is “created as an essential step in the utilization of the computer program”).

⁹ See TRIPS, Article 10. See also WCCT, Article 4.

¹⁰ Under US law, only works which are also fixed in a tangible medium may be protected. 17 USC § 102(a). The issue of fixation has also been long resolved in favor of protection for computer software programs. Thus, even works which are fixed only momentarily may be protected. Cf. *Sega Enterprises Ltd. v. Maphia*, 948 F. Supp. 923 (N.D.Cal. 1996)(reproduction in RAM is sufficient fixation to require permission of copyright owner).

¹¹ 499 US 340 (1991).

¹² To be “original” the work must also be created by the individual claiming authorship, and not be copied. *Id.*

¹³ *Id.* at 1298 (quoting *Burrow Giles Lithographic Co. v. Sarony*, 111 US at 59-60 (1884)).

¹⁴ 58 USPQ2d 1849 (MD Fla. 2001).

to require no creativity whatsoever.”¹⁵ Purely mechanical transformations, by contrast, lack such qualifying creativity and do not produce protectable works.¹⁶

In connection with computer software programs, courts have imposed an exacting scrutiny on the expressive nature of the copyrightable program. As a result of their unique nature, computer software programs have several potential elements which may be subject to copyright protection. Because computer software programs generally contain some level of user interface, the screen displays -- the graphic elements -- of a program are one area of potential copyright protection. So long as such graphic elements are original they are generally protected in the same fashion as other graphic elements.¹⁷ Graphic interfaces are no doubt an important element of the GreenGenes and BlueGenes software programs, particularly since it is anticipated that the program may be made available over the Internet for users to operate the program and convert their own DNA into music. These screens would no doubt be copyright protectable so long as they contain non-functional graphic elements. Such protection, while helpful, however, does not address the more critical issue of the protection for the conversion process itself which is at the heart of the innovative development SING desires to protect.

The conversion process is undoubtedly expressed in the underlying software code. US copyright law has long recognized that the human readable source code and the machine readable object code of a computer program may be subject to copyright protection so long as it contains original expression.¹⁸ There is no doubt that, at the macro level, SING’s code contains some expressive elements and is, therefore, subject to copyright protection. The more difficult issue is determining *how much* of the code qualifies as protectable expression. This combined legal and factual issue is critical to determining the extent to which SING can prohibit Cecelia and others from marketing and using the BlueGenes program in competition with SING’s DNA conversion program.

It is axiomatic that copyright protection does not extend to ideas. However, it is not always clear what qualifies as a protectable expression and what qualifies as an unprotected idea. In an early decision involving the copyrightable nature of contest rules, the court in *Morrissey v. The Proctor & Gamble Co.*¹⁹ recognized that copyright protection does not extend to functional language, or language for which there are a minimal number of alternative expressions. In connection with designing rules for a contest the court acknowledged that “the topic necessarily requires ‘if not only one form

¹⁵ In reaching this conclusion, the court in *Superchips* also rejected Ford’s claims that because Superchips’s adjustments occurred within the parameters of Ford’s original program they lacked originality. *Id.*

¹⁶ See, e.g., *Tempo Music, Inc. v. Famous Music Corp.*, 838 F. Supp. 162 (SDNY 1993)(harmony which is merely a mechanical by-product of the melody is not protected).

¹⁷ See, e.g., *Stern Electronics, Inc. v. Kaufman*, 669 F.2d 852 (2d Cir. 1982)(screen displays and graphic user interfaces are subject to copyright protection so long as they contain sufficient originality and expression).

¹⁸ See, e.g., *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 US 1033 (1984)(source and object codes are protectable if they contain sufficient originality and expression).

¹⁹ 379 F.2d 675 (1st Cir. 1967).

of expression, at best only a limited number’.²⁰ Where protection “could exhaust all possibilities of future use of the substance,” the court declined to protect such expression under copyright.²¹ Thus, if there are a limited number of ways in which to express an idea, the expression is deemed to have “merged” with the idea, making it unprotectable under US copyright law.²²

Courts have long recognized that software code is largely functional in nature. In a recent decision involving the application of the anti-circumvention provisions of the Digital Millennium Copyright Act²³ to prohibit the dissemination of code used to circumvent copy-protection code for DVD’s, the Court stressed that the functional nature of computer code has a direct impact on the scope of protection to be afforded such codes:

Unlike a blueprint or a recipe, which cannot yield any functional result without human comprehension of its content, human decision-making, and human action, computer code can instantly cause a computer to accomplish tasks and instantly render the results of those tasks available throughout the world via the Internet. The only human action required to achieve these results can be as limited and instantaneous as a single click of a mouse. These realities of what code is and what its normal functions are require a First Amendment analysis that treats code as combining nonspeech and speech elements, *i.e.*, functional and expressive elements.²⁴

This functional nature has led to an increasingly limited scope of protection for computer software programs under US copyright law. In a seminal case involving alleged copyright infringement of the structure, sequence and organization of a computer software program, the court in *Computer Associates International Inc. v. Altai, Inc.*²⁵ imposed a tri-partite test for determining whether the expressive elements of plaintiff’s program had been infringed. Designed to separate protectable expression from unprotected ideas, the *Altai* court required plaintiffs to (1) abstract the non-copyrightable ideas from the work,²⁶ (2) filter out the identified unprotectable ideas,²⁷ and then (3)

²⁰ *Id.* at 678.

²¹ *Id.*

²² See also *Kregos v. The Associated Press*, 939 F.2d 700 (2d Cir. 1991)(where there are limited ways of expressing an idea, protection will not be granted if such protection effectively serves to protect the idea). Where the subject matter can only be expressed in a limited number of forms of expression, some courts grant copyright protection but only prevent verbatim or near verbatim copying. See, *e.g.*, *Sassafras Enterprises Inc. v. Roshco., Inc.*, 889 F. Supp. 343 (ND Ill. 1995)(infringement of copyright in commercial label requires verbatim or near verbatim copying).

²³ 17 USC §§1201, et al.

²⁴ *Universal City Studios, Inc. v. Corley*, 273 F.3d 429, 451 (2d Cir. 2001).

²⁵ 982 F.2d 693 (2d Cir. 1992).

²⁶ Computer programs are usually divisible into at least six levels of descending generality: (1) the main purpose of the program; (2) the program structures or architecture; (3) modules; (4) algorithms and data structures; (5) source code; and (6) object code. See generally *Gates Rubber Company v. Bando Chemical Industries Ltd.*, 9 F.3d 823, 834 - 35 (10th Cir. 1993).

²⁷ Among the unprotected elements to be filtered out are those dictated by business demands. See, *e.g.*, *Computer Management Assistance Co. v. Robert F. DeCastro Inc.*, 220 F.3d 396 (5th Cir. 2000).

compare the remaining copyrightable expression to determine if they are substantially similar. In filtering out the unprotected ideas the court examined the structural components of the program to determine “whether the inclusion of the expression at issue was ‘an ‘idea’ or was dictated by considerations of efficiency ... required by factors external to the program itself; or taken from the public domain.”²⁸

US courts have similarly allowed the unauthorized copying of the functional language of a computer software program by a competitor where such functional language is necessary to achieve interoperability.²⁹ Thus, copyright protection will not protect all aspects of the GreenGenes code, but only those elements which meet the stringent expressiveness requirements of *Altai* and its progeny.

Given the increasingly narrow scope of protection for software code under US law, SING should determine the extent to which the language of the code for the GreenGenes software reflects protectable expression. To the extent the language of the code is required to effectuate the mechanical functions of the conversion process, it may be subject to only thin copyright protection at best, particularly if such purely functional language also lacks useful, alternative expressive forms.

The existence of US patents for the GreenGenes and BlueGenes programs does not adversely affect their copyrightable nature. Despite certain indications that US courts have not fully abandoned the election doctrine,³⁰ a creator may own both a copyright and patent on a work since each protects different aspects of that work.³¹ Copyright will protect only the protectable expression contained in the program. It will not prevent competitors from creating programs with different expressions that convert DNA into music, and thus, will not prevent others from “practicing” the claimed patentable invention.

Ownership of the GreenGenes and BlueGenes Software Programs

Under US law, copyright ownership initially vests in the author of the work.³² Where the work is created by an employee within the scope of his or her employment, copyright vests initially in the employer, without the need for a written agreement.³³ Under the facts presented, it appears that there are two potential authors of the

²⁸ The *Altai* approach has met with approval in several circuits. See, e.g., *Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F.2d 1510 (9th Cir. 1993), *Gates Rubber Company v. Bando Chemical Industries, Ltd.*, 9 F.3d 823. It has not been limited in application to attempts to protect structure, sequence and organization, but has also been applied to determine the copyright protectable nature of graphic user interfaces as well. See, e.g., *Apple Computer Inc. v. Microsoft Corp.*, 35 F.3d 1435 (9th Cir. 1994).

²⁹ See, e.g., *Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F.2d 1510 (9th Cir. 1993).

³⁰ See, e.g., Doris Estelle Long, *First Let's Kill All the Intellectual Property Lawyers!': Musings on the Decline and Fall of the Intellectual Property Empire*, 34 John Marshall L. Rev. 851 (2001).

³¹ Cf. *Laureyssens v. Idea Group*, 1991 WL 190539 (SDNY 1991)(absence of patent novelty in foam rubber puzzle did not prevent copyright protection).

³² 17 USC § 201 (“Copyright ... vests initially in the author or authors of the work.”).

³³ 17 USC §§ 101, 201(b)(defining a work for hire as a “work prepared by an employee within the scope of his or her employment and granting copyright ownership to the employer absent a written agreement to the contrary) (respectively).

GreenGenes program -- Cecelia Cellout and Igor Inventor. Cecelia provided the idea for the program. Igor apparently created the source code. The Copyright Act does not contain a definition of authorship per se. Nevertheless, courts have generally required that an author contribute copyrightable expression to a work in order to qualify as a joint author.³⁴ Contributions of ideas alone, such as Cecelia's contributions of ideas for the business method of delivery of the DNA conversion process appear insufficient to qualify Cecelia as a potential author of the GreenGenes program.³⁵ Igor, however, as the creator of the code itself, would qualify as an author. Since he was an employee of SING, and the scope of his duties as a programmer appears to include the creation of the GreenGenes program, the code should qualify as a work for hire.³⁶ As such, SING should qualify as the copyright owner under US law. There is no need for any written agreement between the parties since such ownership rights accrue by operation of law.

Copyright ownership of the BlueGenes program is less clear. It appears that in creating the more complex BlueGenes program, Cecelia may have contributed more than merely ideas. According to the information we possess, she and BBQ both worked on introducing the greater complexity into the earlier program that resulted in the production of a more complex musical end product. Their work consisted in a series of emails and faxes. Under US law, to qualify as a work of joint authorship, the authors must have intended that their contribution to the work "be merged into inseparable or interdependent parts of a unitary whole."³⁷ In addition, courts have generally required that each alleged

³⁴ See generally 17 USC § 101 (definition of joint authorship requiring that authors have intended their contributions to be "merged into inseparable or interdependent part of a unitary whole").

³⁵ See, e.g., *Childress v. Taylor*, 945 F.2d 200 (2d Cir. 1991)(provision of ideas and research are insufficient to qualify contributor as a joint author); *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061 (7th Cir. 1994)(actors participating in improvisational scenes did not provide independently copyrightable expression and were, therefore, not joint authors). *But cf* I Melville & David Nimmer, NIMMER ON Copyright §6.03 (1992)(suggesting that a minority view holds that contribution of ideas is sufficient so long as the work as a whole contains original expression). In determining joint authorship, the custom of the relevant industry or profession is often considered. See, e.g., *Systems XIX Inc v. Parker*, 30 F. Supp.2d 1225 (ND Cal. 1998) The absence of a written agreement regarding Cecelia's authorship seems to indicate that no custom exists which would elevate her activities to the level of co-authorship.

In *Muller v. CP Chemicals, Inc.*, 808 F. Supp. 1238 (DSC 1992), computer programs designed by an employee which were written and tested at home on the employees personal computer qualified as a work for hire. Even though the employee was not paid for his work in creating the programs, they were considered within the scope of his employment because they were created to simplify work-related duties. This analysis appears to bolster SING's claim to the GreenGenes program.

³⁶ There is no indication of any written agreement between SING and Igor to the contrary, although this fact would need to be confirmed. In deciding whether the creation of a copyrighted work occurs within the scope of one's employment courts have applied the three factor test of Section 228 of the Restatement (Second) of Agency. See, e.g., *Avtec Systems, Inc. v. Peiffer*, 21 F.3d 568 (4th Cir. 1994). Under Section 228 a servant's conduct is within the scope of employment "only if (a) it is of the kind he is employed to perform (b) it occurs substantially within the authorized time and space limits; [and] (c) it is actuated, at least in part, by a purpose to serve the master." Restatement (Second) of Agency, Section 228 (1958).

³⁷ 17 USC § 101 (defining joint authorship). Even if Cecelia had contributed some copyrightable expression to the conversion program, with the expectation that her expression would be merged with Igor's in order to create a joint work (the second element of joint authorship under copyright law), the doctrine of corporate opportunity might further prohibit her claiming any copyright ownership in the work. In *Robinson v. R&R Publishing Inc.*, 943 F. Supp. 18 (DDC 1996), the court denied a claim of copyright ownership to a former corporate officer of a company formed to publish a medical textbook. Finding that

joint author contribute an independently copyrightable element to the final work.³⁸ Until the nature of the information exchanged in the relevant faxes and emails is determined, it is not clear whether Cecelia contributed more than simple ideas concerning the improvements to the program. If she contributed more than simple ideas, and this contribution were contained in the fixed form of the faxes or emails exchanged by the parties, Cecelia may qualify as a joint author of the BlueGenes program.³⁹

If Cecelia is not a true joint author of the work, the “agreement” between she and BBQ would not alter this status. It might, however, be treated as an attempt to transfer to Cecelia a one-half interest in copyright to the work. It is not clear from the fact situation if the agreement was oral or in writing. Under US copyright law, any assignment of ownership rights in a copyright must be in writing to be effective. Oral agreements are not valid.⁴⁰ At best, if the agreement is not represented by the necessary signed writing to qualify as an assignment, Cecelia’s and BBQ’s agreement would only qualify as an oral non-exclusive license from BBQ (the author of the program) to Cecelia. Such oral licenses do not have to be in writing to be effective.⁴¹ The non-exclusive nature of this license grant should make Cecelia’s subsequent grant of exclusive rights to CellGene ineffective.

If Cecelia is determined to be an actual joint author of the BlueGenes source code, then she has the right to assign or license her interest to CellGene without BBQ’s knowledge or consent. Each joint author is considered to own an undivided one-half interest in the copyrighted work.⁴² Such interest allows both BBQ and Cecelia to assign or license their individual interests in the BlueGenes program without the consent of the

the officer’s acts amounted to an attempt to seize a corporate opportunity in which the corporation had a reasonable expectancy, the officer was ordered to hold the copyright ownership for the benefit of the corporation.

³⁸ See, e.g., *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061 (7th Cir. 1994).

³⁹ The amount of her contribution to the new original expression contained in the BlueGenes software should not affect her co-ownership of this new work.

In a recent Ninth Circuit decision, *Aalmuhammed v. Lee*, 202 F.2d 1227 (9th Cir. 2000), the court declined to extend joint authorship status to a consultant on a movie who had contributed a separately copyrightable portion to a screenplay. The court rejected the claim, in part, because the purported author did not supervise the creation of the film and there was no objective manifestation of an intent to be co-authors. Although there was apparently some type of co-authorship agreement between Cecelia and BBS, their independent actions after completion of the program (including entering into separate exclusive license agreements with different entities) seem to contradict joint authorship status. Thus, if Cecelia did not closely supervise BBQ’s work, even if her contribution were separately copyrightable, Cecelia might not qualify as a joint author under *Aalmuhammed*.

⁴⁰ 17 USC §204(a)(requiring a transfer of copyright other than by operation of law to be in writing and be signed by the owner of the rights conveyed “or such owner’s duly authorized agent”). See, e.g., *Effects Associates Inc. v. Cohen*, 908 F.2d 555 (9th Cir. 1990), cert. denied, 498 US 1102 (1991). This writing requirement applies equally to transfers between joint authors. See, e.g., *Glovaroma Inc. v. Maljack Productions, Inc.*, 71 F. Supp.2d 846 (ND Ill. 1999).

⁴¹ See, e.g., *Effects Associates v. Cohen*, 908 F.2d 555 (oral non-exclusive license to reproduce copyrighted special movie effect enforceable).

⁴² 17 USC § 201 (joint authors are “co-owners of copyright in the work”). See also *Glovaroma, Inc. v. Maljack Productions, Inc.*, 71 F. Supp.2d 846 (ND Ill. 1999)(absent an agreement to the contrary, co-owners own an equal share in the copyrighted work).

other.⁴³ Consequently, BBQ, as an undeniable author and potential joint author of the separately copyrightable portions of the BlueGenes program, appears to be within her rights when she granted SING a license to use the program. SING can thus use the program in accordance with this license agreement without infringing Cecelia's rights in the program.

It is less clear, however, whether SING can rely upon the exclusive nature of the license to prevent CellGene's use of the program if Cecelia is in fact a joint author of the BlueGene's code. Generally, joint authors do not have the right to unilaterally grant an exclusive license.⁴⁴ Consequently, Cecelia's grant of an exclusive license to CellGene should be ineffective. Such grant, however, might be treated as a non-exclusive license, which would be within the scope of her rights as a joint author. If the BlueGenes program qualifies as an unauthorized derivative work,⁴⁵ however, Cecelia's license as a joint author of the BlueGenes program should not eliminate CellGene's liability for infringing the GreenGenes program.

The nature of the work conducted in creating the BlueGenes program raises more directly a question regarding whose law would apply in determining copyright ownership. It appears from the facts that creation may have occurred equally in the US and in the UK. Counsel would need to confirm that the tests for joint authorship, and the scope of their rights is not significantly different under UK law. If it is, an analysis of choice of law may also be necessary to determine whose law would govern any dispute between the parties, regardless of the location of the suit.

The Infringing Nature of the BlueGenes Program

Even if Cecelia and BBQ qualify as joint authors of the BlueGenes program, such joint authorship does not resolve the critical question of whether the creation and use of that program violates SING's copyright in its GreenGenes program. Under US copyright law, SING is entitled to exercise four exclusive rights in connection with its copyrightable computer program. These four rights are the right to do or to authorize the following:

1. The reproduction, in whole or in part of the program;
2. The distribution of the work, in whole or in part, by sale, license or otherwise;
3. The creation of derivative works or adaptations of the program;
4. The public performance of the program, such as through Internet distribution of the work.⁴⁶

⁴³ Such license, however, would be subject to BBQ's obligation to provide an accounting of the profits made. *See, e.g., Oddo v. Ries*, 743 F.2d 630 (9th Cir. 1984).

⁴⁴ *See e, g., Glovaroma Inc. v. Maljack Productions, Inc.*, 71 F. Supp.2d 846 (ND Ill. 1999); *Denker v. Twentieth Century Fox Film Corp.*, 223 NYS2d 193 (1961).

⁴⁵ *See* discussion *infra* under "The Infringing Nature of the BlueGenes Program."

⁴⁶ *See, e.g.* 17 USC § 106 (detailing the exclusive rights granted a copyright owner under US law). The other two exclusive rights granted to a copyright owner -- to publicly display the work and to perform a musical work publicly by means of a digital audio transmission -- do not appear directly applicable to the

Under the current fact situation it appears that distribution and/or use of the BlueGenes program may infringe SING's exclusive rights of reproduction, distribution and creation of derivative works. In order to qualify as an infringement, however, the BlueGenes work must reproduce copyrightable expressions in the GreenGenes program.

As a general matter, in order to prove infringement under US copyright law, SING must establish the following:

1. The copyrightable nature of the program;
2. Its copyright ownership of the GreenGenes program;
3. Access by Cecelia and/or BBQ (the purported creators of the infringing work) to the GreenGenes program; and
4. Substantial similarity in the copyrightable expression of the two programs.⁴⁷

For the reasons set forth above, the software program appears to be copyright protectable. Based on the facts we currently possess, it also appears that SING is the sole owner of the copyright in the program since it was created by Igor within the scope of his employment and, therefore, qualifies as work for hire. It would, however, be advisable for SING to register its copyright as soon as possible. Such registration serves as prima facie evidence of both the copyrightable nature of the GreenGenes program and of SING's status as the copyright owner of the work.⁴⁸ Registration would, therefore, make proof in any suit to enforce SING's copyright in the program simpler. Moreover, as a US company and, therefore, a US copyright owner, SING must register its claim to copyright prior to initiating a lawsuit in the United States to enforce its copyright claim.⁴⁹ Thus, expedited registration would solve several potential enforcement problems and would put SING in a position to bring suits to enforce its rights on an expedited basis in the United States should the need arise.

It appears highly likely that Cecelia had access to the source code for the GreenGenes program in her earlier position as CEO of SING. If she did, then access to the program in creating the potentially infringing BlueGenes program is established. Even if there were no access to the program (hard to believe given the relatively short time it took to create the BlueGenes program), proof of the "striking similarity" between the two programs should be sufficient to establish such required access.⁵⁰

current issues facing SING. It should be noted, however, that if SING is the sole copyright owner of the music created using the DNA conversion software, it would have the exclusive right under US copyright law to control the digital distribution of such music, including in particular its transmission as part of an interactive digital audio service. See 17 USC § 106(6).

⁴⁷ See, e.g., *Feist Publications Inc.*, 499 US 340; *Computer Associates International, Inc.*, 982 F.2d 693.

⁴⁸ 17 USC § 410(c)(certificate of registration made before or within five years after first publication of the work constitutes prima facie evidence of validity).

⁴⁹ 17 USC § 411(registration required prior to institution of lawsuit by US copyright owner).

⁵⁰ See, e.g., *ABKCO Music Inc. v. Harrisongs Music Ltd.*, 722 F.2d 988 (2d Cir. 1983); *Selle v. Gibb*, 741 F.2d 896 (7th Cir. 1984).

The more difficult issue in any suit to prohibit the continued unauthorized use of the BlueGenes program is the question of whether such program is substantially similar to SING's GreenGenes program. As noted above, the determination of whether one software program infringes another requires a complicated three-step analysis to determine whether in fact the junior program copies protectable expression without authorization.⁵¹ The nature of the two programs, the fact that they both convert DNA into music, and that the BlueGenes program was developed with the assistance of a disgruntled former CEO who was intimately involved in creation of the GreenGenes program, all provide circumstantial evidence of similarity. However, until SING obtains a copy of the source code for the BlueGenes program, and has an opportunity to analyze it, SING cannot be absolutely certain that the BlueGenes program infringes its copyright. The simple fact that the BlueGenes program accomplishes the same end -- conversion of DNA into music -- does *not* guarantee that such program infringes the copyright in the GreenGenes program. It is the substantial similarity of expression in the two programs that is actionable under copyright law; *not* substantial similarity in ideas, processes or end results.

It seems clear that the BlueGenes program is not a literal copy of the GreenGenes program since it actually produces an end product which is different from that produced by the GreenGenes program (simple music versus blues). Literal infringement, however, is not required so long as the two programs are substantially similar.⁵² Substantial similarity "requires that the copying [be] quantitatively and qualitatively sufficient to support the legal conclusion that infringement has occurred."⁵³ Such substantial similarity is judged by an "ordinary observer"⁵⁴, "total concept and feel,"⁵⁵ "abstraction"⁵⁶ or "iterative reproduction" standard.⁵⁷

⁵¹ See *Computer Associates International Inc.*, 982 F.2d 693.

⁵² If the two programs are *not* substantially similar, Cecelia and BBQ would be considered an infringement of SING's copyright by creating an unauthorized copy of the work in order to create the BlueGenes program. Intermediate copying of a computer program to study its unprotected ideas (merged utilitarian expression) has been considered a fair use where the resulting program did not infringe and the language was studied for purposes of improved interoperability. See, e.g., *Sega Enterprises Ltd v. Accolade Inc.*, 977 F.2d 1510 (9th Cir. 1992). Such limitations do not appear in the present situation. However, in *Sony Computer Entertainment Inc v. Connectix Corp.*, 203 F.3d 596 (9th Cir.), *cert. denied*, 121 S.Ct. 172 (2000), intermediate copying of Sony's copyrighted BIOS system was also held to constitute a fair use even though the product was a replacement product and defendant's copying of the underlying program had not been undertaken solely to study functional language for interoperability but for the express purpose of creating a competing product. The facts in *Connectix* are much closer to those in the present case and suggest that any copying undertaken by Cecelia or BBQ to "study" SING's conversion program would not provide a separate copyright violation.

⁵³ *Castle Rock Entertainment Inc. v. Carol Publishing Group Inc.*, 150 F.3d 132, 138 (2d Cir. 1998).

⁵⁴ See, e.g., *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960)(describing the test as whether "the ordinary observer, unless he set out to detect the disparities, would be disposed to overlook them, and regard [the] aesthetic appeal as the same").

⁵⁵ See, e.g., *Shaw v. Lindheim*, 908 F.2d 531 (9th Cir. 1990). Some courts apply this test without eliminating the non-protected elements. See, e.g., *Steinberg v. Columbia Pictures Industries, Inc.*, 663 F. Supp. 706 (SDNY 1987). This approach has been criticized for over-inclusiveness.

⁵⁶ See, e.g., *Arnstein v. Porter*, 154 F.2d 464 (2d Cir. 1946), *cert. denied*, 380 US 851 (1947); *Computer Associates International Inc.*, 982 F.2d 693.

Given the probable similarity of the two programs, and the subsequent creation in time of the BlueGenes program, there is a strong likelihood that the BlueGenes program would be considered to be an infringing derivative work. One of the exclusive rights granted a copyright owner under both US and international law is the right to authorize the creation of adaptations or derivative works.⁵⁸ To qualify as a derivative work under US law, the program must be “based upon [a]... pre-existing work” and must “recast, transform[] or adapt[]” the work.⁵⁹ It seems likely that the BlueGenes program contains both original language from the GreenGenes program as well as additional language created by Cecelia and/or BBQ. As such, it is a derivative work, for which permission was required to create the work.⁶⁰ Failure to obtain such permission would qualify as an additional ground for copyright infringement in any suit against Cecelia and BBQ with regard to the unauthorized use of the BlueGenes program.

Cecelia and BBQ would be liable for copyright violations, even if their new program were a transformative work that contained sufficient original expression to qualify as a separately copyrightable work. A derivative work may be separately copyrightable to the extent the changes in the derivative work demonstrate sufficient originality. To qualify as a separately copyrightable derivative work, the BlueGenes program must contain original aspects that are more than “mere trivial variations” of the original.⁶¹ Some courts have imposed a higher level of originality for derivative works. In *Entertainment Research Group Inc. v. Genesis Creative Group*,⁶² for example, the court required proof that copyright in the derivative work would not interfere with the original author’s right to create or license subsequent derivative works.⁶³ Since the end product of the BlueGenes software is distinctively different from that of the GreenGenes software, it appears likely that sufficient originality exists in the BlueGenes software to provide a separately copyrightable work. Such a separate copyright, however, does not grant the owner the automatic right to use or authorize others to use the copyrighted work given its derivative nature. Even if the BlueGenes program is an innovative

⁵⁷ See, e.g., *E.J. Johnson Co. v. Uniden Corp. of America*, 623 F. Supp. 1485 (D Minn 1985)(iterative reproduction requires evidence of reproduction by exact duplication of substantial portions of the copyrighted work)

⁵⁸ 17 USC §106 (listing the right to create derivative works as one of the six exclusive rights granted US copyright owners). See also Berne Convention for the Protection of Literary and Artistic Works, reprinted in Doris Estelle Long and Anthony D’Amato, INTERNATIONAL INTELLECTUAL PROPERTY LAW-2002 DOCUMENT SUPPLEMENT (West 2002), at Article 12.

⁵⁹ 17 USC §101 (definition of a derivative work).

⁶⁰ If, however, it does not incorporate any copyrightable expression from the GreenGenes program, the BlueGenes would most likely not qualify as an infringing derivative work. See *Louis Galoob Toys, Inc. v. Nintendo of America, Inc.*, 964 F.2d 965 (9th Cir. 1992)(a device that enhances audiovisual displays in a game cartridge did not constitute a derivative work because it did not incorporate a portion of a copyrighted work in some concrete or permanent form). But cf. *MicroStar v. FormGen, Inc.*, 154 F.3d 1107(9th Cir. 1998)(MPS files qualify as derivative work even though they did not reproduce the copyrighted art of a video software program since they described in exact detail the AV display at issue).

⁶¹ See, e.g., *Durham Industries Inc. v. Tomy Corp.*, 630 F.2d 905 (2d Cir. 1980).

⁶² 122 F.3d 1211 (9th Cir. 1997).

⁶³ See also *Gracen v. Bradford Exchange*, 698 F.2d 300 (7th Cir. 1983)(a substantial variation between the derivative work and the underlying work is required).

improvement, under copyright law, it cannot be reproduced or marketed without the approval of the copyright owner of the underlying GreenGenes program.

Copyright Ownership of the Music

One of the most intriguing aspects of SING's DNA conversion software is the end-product -- music that is supposedly unique because it is created from each individual's unique DNA. Music has long been recognized as a copyright protectable form of expression.⁶⁴ However, the music at issue in this matter is created in an extremely non-traditional manner. As opposed to being created through the intellectual and creative efforts of human composers the song is created through the mechanical efforts of a software program and a person's DNA.

It is doubtful that the song would qualify as a "derivative" work, even though it is mechanically "derived" from the software. Since US copyright law requires that a work be recast or transformed to qualify as a derivative work, most courts require that some copyright protectable expression of the original appear in the derived work.⁶⁵ This requirement of "fixation" of copyrightable elements in a derivative work, however, is not an absolute obligation. Thus, for example, in *MicroStar v. FormGen, Inc.*,⁶⁶ failure to incorporate source at did not prevent MicroStar's program from being an unauthorized derivative work. Its invocation of FormGen's art library to tell the "Duke Nukem story" was sufficient.

It seems unlikely that any element of the code actually appears in the song. The closest analogy to the present situation may be the "derivative" videogame in *MicroStar* or the trivia books in *Castle Rock Entertainment Inc. v. Carol Publishing Group, Inc.*,⁶⁷ and *Twin Peaks Productions, Inc. v. Publications International Ltd.*⁶⁸ Yet each of these "derivations" purportedly shared copyrightable story elements from the original work. No such "derivative" elements appear in the genetic music. Instead, the music appears to be a purely mechanical end product of the software.

If the song does not qualify as a derivative work, to the extent that the conversion process is responsible for generating copyright protectable aspects of the song, the potential "authors" of the song are theoretically the software and the owner/provider of the DNA used to create the song. Since courts generally prefer human authors,⁶⁹ the software does not itself qualify as a co-author. Instead, the copyright owner of the software should qualify as a potential joint author of the Elton John song (and any other

⁶⁴ See, e.g., 17 USC § 102 (listing music as a work that may be subject to copyright protection). See also Berne Convention, Article 2 (listing music as a copyright protectable work).

⁶⁵ See, e.g. *Lewis Galoob Toys, Inc. v. Nintendo of America, Inc.*, 964 F.2d 965 (9th Cir. 1995).

⁶⁶ 154 F.3d 1107 (9th Cir. 1998).

⁶⁷ 150 F.3d 132 (2d Cir. 1998)(Seinfeld trivia book).

⁶⁸ 996 F.2d 1366 (2d Cir. 1993)(Twin Peaks trivia book).

⁶⁹ See, e.g., *Urantia Foundation v. Kristin Maaherra*, 114 F.3d 955 (9th Cir. 1997)(works involving purely channeled authorship did not qualify for copyright protection).

song created by the conversion process).⁷⁰ The real question is whether the provision of DNA itself qualifies as a copyright protectable activity capable of granting Elton John co-authorship rights in the song.

Although music generally qualifies for copyright protection, it is doubtful that the Elton John song qualifies as an original work of authorship within the meaning of Section 102 of the Copyright Act. Artistic merit is neither a requirement nor a basis for copyright protection under US law.⁷¹ The resulting song created by converting Elton John's DNA into music probably possessed a certain degree of artistry as demonstrated both by the critical acclaim the song received as well as its commercial success. Yet such "artistry" alone may not be sufficient to meet the modicum of creativity requirement for originality under *Feist*.⁷² It appears that the music in question is produced through the purely mechanical function of running the conversion software with a particular DNA. Hence, the music created appears to be merely the result of a purely mechanical process. If this is true, then the song appears to lack the necessary originality.⁷³

To the extent that the song represents more than a purely mechanical transformation, any originality which the song might have from other songs generated by the conversion software is a direct result of the provision of DNA. Yet despite the apparently direct link between Elton John's DNA and any potentially original aspects of the resulting music, it seems doubtful that mere provision of DNA is a sufficient *creative act* to warrant the grant of co-authorship.

As noted above, to qualify as a joint author, Elton John must have provided some copyright protectable expression to the song.⁷⁴ DNA does not appear to qualify as copyrightable expression, even if it were in electronic form.⁷⁵ Since there is no expressive element to DNA, Elton John has not provided any copyrightable element to the song.⁷⁶ To the contrary, the provision of DNA appears to be a mere mechanical or routine act which requires no creativity at all. Such act may well lack the necessary modicum of originality necessary to establish a copyrightable work.⁷⁷ In the absence of providing any such individual copyrightable element, neither Elton John nor any other

⁷⁰ See, e.g., *William Electronics, Inc. v. Artic International Inc.*, 685 F.2d 870 (3d Cir. 1982)(interactive videogame copyright owner is sole owner; player of interactive game has no copyright).

⁷¹ See, e.g., *Bleistein v. Donaldson Lithographic Co.*, 188 US 239 (1903).

⁷² *Feist Publications, Inc.*, 449 US 340. See also notes 11 - 15 *supra* and accompanying text.

⁷³ See note 15 *supra* and accompanying text.

⁷⁴ See discussion *supra* under the section entitled "Ownership of the GreenGenes and BlueGenes Software Programs."

⁷⁵ See discussion *infra* under the section entitled "Copyright Ownership of the Genetic Sequences."

⁷⁶ This assumes that the song that was distributed consisted solely of the musical composition derived from the DNA conversion process. To the extent that it also contained lyrics created by Elton John, the copyright in the lyrics would of course belong to him. It is unlikely that SING would have any rights to the lyrics as a joint author, since there appears little evidence to support an intention to create a joint work composed of music and lyrics. In the absence of any such intention, a claim for joint authorship of the lyrics would most likely fail.

⁷⁷ Compare with *Superchips Inc. v. Street & Performance Electronics Inc.*, 58 USPQ2d 1849 (MD Fla 2001)(differentiating originality on the grounds of the non mechanical nature of plaintiff's changes to certain computer codes).

DNA donor should have any rights to the music created from the conversion process. Elton John would, however, have certain performance rights in his own rendition of the song and in any lyrics he may have created.⁷⁸

Copyright Ownership of the Genetic Sequences

It is anticipated that SING will post genetic sequences on its website. The posting of such sequences should not give rise to issues under copyright since the sequences do not appear to contain original expression. The sequence is not “created,” it is instead merely a mechanical translation of a naturally occurring object. As such it would appear to lack any modicum of originality.⁷⁹ The fact that such mechanical translation was achieved after a great deal of research (“sweat of the brow”) should not alter the non-copyrightable nature of the sequences. As the Court in *Feist* recognized: The first person to find and report a particular fact has not created the fact; he or she has merely discovered its existence.⁸⁰

Internet Issues

Copyright Postings of DNA Information

SING’s posting of copyrighted information on its website without the permission of the copyright owner does not qualify as a fair use, regardless of the educational motives behind such postings. US law does not provide categorical fair use exemptions. Thus, the fact that any copyrighted work may be published for education or news reporting purposes is not, by itself, sufficient to exempt such postings from liability under US copyright law.⁸¹ To the contrary, the determination of whether any particular use qualifies as a fair one is determined on a case by case basis. Section 107 of the 1976 Copyright Act sets out four non-exclusive statutory factors to consider in determining whether a given use is a “fair” one or not. They are:

1. The purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. The nature of the copyrighted work;
3. The amount and substantiality of the portion used in relation to the copyrighted work as a whole;
4. The effect of the use upon the potential market for or value of the copyrighted work.⁸²

⁷⁸ See generally 17 USC §106(6). See also note 76 *supra*.

⁷⁹ See discussion *supra* under the section entitled “Copyright Ownership of Software Programs.”

⁸⁰ 499 US at 1288.

⁸¹ See, e.g., *Los Angeles News Service v. Reuters Televisions International Ltd.*, 149 F.3d 987 (9th Cir. 1998)(copying footage of Los Angeles riots without more is *not* fair use); *Los Angeles Times v. Free Republic*, 54 USPQ2d 1453 (CD Cal 2000)(posting of news articles for purposes of comment and criticism *not* a fair use).

⁸² 17 USC § 107. See also cases cited *infra*.

No one factor is dispositive, although courts generally place a heavy emphasis on the potential adverse market impact of defendant's use.⁸³ Courts may consider additional factors in determining the fair use nature of the use in question, including whether it is transformative⁸⁴ or has an adverse impact on free speech rights under First Amendment doctrines.⁸⁵

While the posting of information about DNA may serve a beneficial informational purpose, there seems little question that posting of such information has an indirect commercial benefit for SING. Such postings make the site more appealing and assist in promoting use of DNA conversion software.⁸⁶ While SING is only posting excerpted articles, such excerpting process does not guarantee protection under the fair use doctrine. To the contrary, where the "heart" of the matter has been reproduced, either in quantitative or qualitative terms, courts have declined to find the use a fair one.⁸⁷

As currently planned, the excerpted articles are not being used to create a new work, or in any other transformative manner.⁸⁸ The ultimate determination of whether a particular use will qualify as fair under Section 107 requires a detailed factual analysis of the type of work being excerpted, the amount and qualitative nature of the material included in each excerpt and the market impact of the posting of these excerpts.

⁸³ See, e.g., *Harper & Row Publications, Inc. v. Nation Enterprises*, 471 US 539, 566 (1985) (market impact is "undoubtedly the single most important element of fair use"). Recently, however, the Supreme Court in *Campbell v. Acuff-Rose Music Inc.*, 510 US 569 (1994), indicated that the importance of market impact is relative. It is "a matter of degree, and the importance of this factor will vary, not only with the amount of harm, but also with the relative strength of the showing on the other factors." *Id.* at 590 n.21.

⁸⁴ See, e.g., *Campbell v. Acuff-Rose Music Inc.*, 510 US 569 (1994) (parody of song "Pretty Woman" was fair use in view of transformative nature of the use in question). To qualify as a transformative use, the use in question must "add[] something new, with a further purpose or different character, altering the first with new expression, meaning or message..." 510 US at 579. Where the material was copied to use it for the "same intrinsic purpose" for which the copyright owner intended, such use does not usually qualify as a transformative fair use. See, e.g., *Jartech Inc. v. Clancy*, 666 F.2d 403 (9th Cir. 1982) (ultimately holding unauthorized copying of plaintiff's films a fair use because it was not being used for the same "intrinsic purpose").

⁸⁵ See, e.g., *Suntrust Bank v. Houghton Mifflin Co.*, 252 F.3d 1165 (11th Cir. 2001) (reversing preliminary injunction on First Amendment grounds). The scope of reliance on First Amendment concerns was reduced in the Eleventh Circuit's subsequent lengthier opinion where the court ultimately based its decision on fair use statutory concerns. See *Suntrust Bank v. Houghton Mifflin Co.*, 268 F.3d 1257 (11th Cir. 2001).

⁸⁶ See, e.g., *Marobie-FL v. National Association of Free Equipment Distributors*, 45 USPQ2d 1236 (ND Ill. 1992) (posting of clipart on free website commercially beneficial since it promoted the association which ran the website, whose members paid dues); *American Geophysical Union v. Texaco, Inc.*, 60 F.3d 913 (2^d Cir. 1995) (Texaco obtained indirect benefit from photocopying of articles for research purposes, which had an impact on its ability to develop marketable products); *Worldwide Church of God v. Philadelphia Church of God*, 227 F.3d 1110 (9th Cir. 2000) (use of copyrighted religious texts to gain adherents was sufficient "advantage" to weigh against fair use).

⁸⁷ Thus, for example, in *Roy Export Company Establishment v. Columbia Broadcasting System, Inc* 503 F. Supp. 1127 (SDNY 1980), *aff'd*, 672 F.2d 1095 (2^d Cir.), *cert. denied*, 459 US 826 (1982), copying as little as 55 seconds of an 89 minute film did *not* qualify as a fair use.

⁸⁸ By contrast, in *Hofheinz v. AMC Productions, Inc.*, 147 F. Supp.2d 127 (EDNY 2001), use of film clips and posters in documentary qualified as a transformative fair use.

Nevertheless, based on present information, the current use does not appear to qualify as a fair one.⁸⁹ In lieu of posting unauthorized excerpts of copyright protectable material, it might be advisable to simply link such material, if they are otherwise legally available on the Net.

The Bulletin Board Service

One of the greatest risks that SING faces in conducting a bulletin board service is potential liability for the unauthorized posting by its users of copyrighted materials. While it appears that the genetic sequences that may be posted are not copyrightable,⁹⁰ songs and other written materials may well be copyrightable. If they are posted without permission of the copyright owner, SING faces potential liability either as a direct infringer⁹¹ or, more likely, as a contributory or vicarious infringer.⁹² Under the Digital Millennium Copyright Act (DMCA), SING can avoid such liability so long as it qualifies under the “safe harbor” provisions of Section 512 of the 1976 Copyright Act.

Under Section 512 “service providers” involved in transitory digital network communication, system caching, information storage and/or the provision of information location tools are not liable for the transmission or distribution of infringing materials.⁹³ The statute defines a “service provider” as “an entity offering the transmission, routing, or providing of connections for digital communications between or among points specified by a user, or material of the user’s choosing without modification of the content of the material as sent or received.”⁹⁴ The Act imposes stringent requirements on service providers to serve as nothing more than a conduit for the materials being transmitted or stored using its services. Thus, for example, in order to qualify for a safe harbor, SING may not initiate the transmission of any bulletin board material. It also may not select the recipients for such materials and must accomplish any such transmission or caching through an automatic technical process, without selecting the precise material to be

⁸⁹ See, e.g., *Los Angeles Times v. Free Republic*, 54 USPQ2d 1453 (CD Cal 2000)(operator of non-profit website jointly and severally liable for unauthorized postings of newspaper articles on its website).

⁹⁰ See discussion *supra* under section entitled “Copyright Ownership of the Genetic Sequences.”

⁹¹ See, e.g., *Playboy Enterprises, Inc. v. Frena*, 839 F. Supp. 1552 (MD Fla 1993)(bulletin board operator liable for direct infringement where copyrighted photographs were uploaded and downloaded onto the bulletin board without his knowledge). *Frena*, however, has been strongly criticized for its potentially adverse impact on Internet development.

⁹² See, e.g., *Religious Technology Center v. Netcom On Line Communications Services, Inc.*, 907 F. Supp. 1361 (ND Cal 1995)(bulletin board service provider may be contributorily liable for infringing material posted by end users); *A&M Records Inc. v. Napster Inc.*, 239 F.3d 1004 (9th Cir. 2001)(owner of website offering free peer-to-peer file sharing software and indexing services vicariously liable; ability to block infringer access to a particular environment is evidence of right and ability to supervise; financial benefit established because future revenue dependent on increases in user base). To qualify as a contributory infringer knowledge of the infringing activity and must induce, cause or materially contribute to the infringing conduct of another. See, e.g., *Gershwin Publishing Corp. v. Columbia Artists Management Inc.*, 443 F.2d 1159 (2d Cir. 1971). To be liable for vicarious infringement, SING must have the right and ability to supervise the infringing activity and also has a direct financial interest in such activities. See, e.g., *Fonovisa Inc. v. Cherry Auction, Inc.*, 76 F.3d 259 (9th Cir. 1996).

⁹³ 17 USC §§ 512(a)(transitory communications); 512(b)(system caching); 512 (c)(information storage at the direction of end users); 512(d)(information location tools).

⁹⁴ 17 USC § 512(k)(1).

transmitted.⁹⁵ Moreover, the DMCA imposes an obligation on covered providers to take down infringing materials or block access to such materials upon receipt of the appropriate notice from the copyright owner.⁹⁶ Failure to take down such infringing materials will result in loss of safe harbor protection.

In order to minimize potential liability, SING should take the necessary steps to qualify as a covered “service provider” under the terms of Section 512 of the Copyright Act. This includes designating an agent to receive notices and listing the same on its website and with the Register of Copyright;⁹⁷ establishing compliant procedures for dealing with the receipt of infringement notices, counter-notices and take-down procedures;⁹⁸ establishing procedures for responding to subpoenas identify infringers⁹⁹ and establishing and implementing termination procedures in accordance with the DMCA.¹⁰⁰

The Sale of Genetic Music over the Internet

The many issues that arise in connection with an effort to protect the digital distribution of music over the Internet are far too complicated to be discussed in this short analysis. The rise of peer-to-peer file sharing and the subsequent explosion of trading in pirated copies of music over the Internet is well documented. At the initial stage, it is critical that the copyright ownership of the music to be provided over SING’s website be established. If SING anticipates limiting its sales of genetic music solely to the end user who provided the DNA sample from which the music is derived, potential copyright liability issues are limited to determining ownership of the BlueGenes software which would be used or provided by SING to create such music. If BBQ’s license is not sufficient to grant SIGN the right to distribute and use the BlueGenes software, potentially, an unauthorized reproduction of the software would occur each time the software was used to create genetic music.¹⁰¹ An unauthorized copy would also be made each time the program is accessed by an end user to create genetic music.¹⁰² While the

⁹⁵ See generally 17 USC §§ 512(a)&(b).

⁹⁶ See 17 USC §§ 512(b)(2)(E), 512(c)(1); 512(d)(3). The notice in question must identify the copyrighted work and the claimed infringing material; provide “reasonably sufficient” contact information for the complaining party; affirm the good faith belief of the complaining party in the infringing nature of the material and an affirmation under penalty of perjury that the complaining party is authorized to act on behalf of the copyright owner. The notice must contain a physical or electronic signature of a person authorized to act on behalf of the owner. See generally 17 USC § 512(c)(3).

The DMCA also requires the ISP to take reasonable steps to notify the subscriber that it has removed or blocked access to the allegedly infringing material and provides steps to be followed in the event of a counter-notice of non-infringement. 17 USC § 512(g). It also permits copyright owners to request the clerk of a US district court to issue a subpoena to an ISP for identification of an alleged infringer. 17 USC § 512(h).

⁹⁷ Such designation and listing is required under Section 512(c)(2).

⁹⁸ See generally 17 USC §§512(c)(3), 512(g), 512(h).

⁹⁹ See generally 17 USC § 512(h).

¹⁰⁰ See generally 17 USC § 512(g).

¹⁰¹ See, e.g., *MAI Systems Corp. v. Peak Computer Sources, Inc.*, 991 F.2d 511 (9th Cir. 1993)(loading computer program into RAM qualifies as the creation of an unauthorized copy).

¹⁰² *Id.*

end user would be a direct infringer of the copyrighted software (as the person who created an unauthorized reproduction of the software), SING could face potential direct liability for its distribution of the software as well as potential liability for contributory and vicarious infringement for the unauthorized reproduction of the software.¹⁰³

If, in addition to providing the software to the public to create genetic music, SING also anticipates selling copies of the genetic music to third parties, potential copyright liability issues are expanded to include the question of ownership of the genetic music. If SING does not own the copyright in the genetic music produced using the BlueGenes program, then it would face liability as a direct infringer for the unauthorized reproduction and distribution of the music.

In addition to resolving the copyright ownership issues described in this paper, SING would also have to face the same problems much of the recording industry faces in connection with the digital distribution of sound recordings. In particular, business issues regarding what technology, if any, should be used to prevent the unauthorized distribution of copies of the genetic music, as well as what efforts to police and combat distribution of pirated songs should be undertaken must be decided. Finally, appropriate click wrap agreements governing bulletin board users, conversion software users and genetic music purchasers would have to be established to clarify SING's right to further commercial use of the genetic music created with its software programs, and limit SING's potential liability under copyright for unauthorized postings and the like by third parties.

¹⁰³ Contributory infringement is a judicially created remedy under copyright. To be guilty of contributory copyright infringement, a party must know of the infringing activity and must cause or materially contribute to it. *See, e.g., Gershwin Publishing Corp v. Columbia Artists Management, Inc.*, 443 F.2d 1159. SING might also face allegations of vicarious liability for the end users' unauthorized use of the BlueGenes program. To be liable it must have the right and ability to supervise the parties engaged in the unauthorized activity and have a direct financial interest in the exploitation of the copyrighted material. *See, e.g., Fonovisa Inc. v Cherry Auction Inc.*, 76 F.3d 259 (9th Cir. 1996). Cecelia's potential status as a joint author of either the GreenGenes or BlueGenes programs should not alter the potential infringing nature of CellGene's use of the BlueGenes program. Cecelia has transferred those rights under a purported exclusive license to CellGene. If Cecelia were a joint author of the programs, she would be unable to infringe copyright in the programs as a matter of law. *See, e.g., Richmond v. Weiner*, 353 F.2d 41 (9th Cir. 1965), *cert. denied*, 384 US 928 (1966).